Air Force Institute of Technology

AFIT Scholar

2022

Academic Year 2021-2022 Faculty Excellence Showcase, AFIT Graduate School of Engineering & Management

Graduate School of Engineering and Management, Air Force Institute of Technology

AFIT GRADUATE SCHOOL OF
ENGINEERING AND MANAGEMENT

FACULTY EXCELLENCE

SHOWCASE

Academic Year
2021-2022

AFIT
Air Force Institute of Technology

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DEAN'S MESSAGE

AFIT's Graduate School Faculty Excellence publication was designed to showcase publications, awards and accomplishments of current faculty and to serve as a reference guide for potential external research partners by featuring research areas of expertise. Download a copy of this publication at www.AFIT.edu/EN/facultyexcellence.

Adedeji B. Badiru
Dean, Graduate School of
Engineering and Management
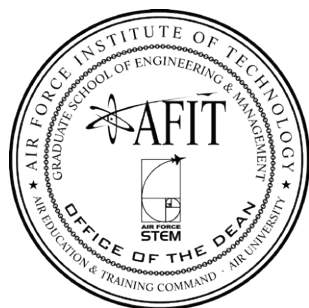
The reputation of a university is predicated on the excellence of the faculty who represent the intellectual foundation of the university. Although AFIT is a military organization, our academic mission places us in the enviable position of operating within the nexus of three cultures of government, academia, and military. Judging by the benchmarks available in academia, I am proud enough of the quality and excellence of our faculty that I refer to AFIT as the "MIT of the Midwest." The contents of this edition of our faculty excellence publication confirms this astute representation.

The Air Force Institute of Technology has a proud heritage dating back over 100 years. Faculty, staff, students, and graduates of AFIT have contributed in no small measure to the national defense of the U.S. consistently for decades. History buffs can confirm this by looking back into the accounts of the courage, determination, and accomplishments of the Doolittle Raiders during World War II. Nowadays, we are leveraging research and development, coupled with technology transfer, as the primary weapon of preserving and advancing national defense. Therein lies the basis for promoting the excellence of the faculty in AFIT's Graduate School of Engineering and Management.

I encourage readers to use this publication as a guide to discovering the diverse expertise of our faculty. Partnership within and outside the school is important to us. Thus, this handbook serves effectively as a "research partner finder." I encourage everyone to use it accordingly.

With the best AFIT regards to all,

Adedeji B. Badiru, Ph.D., P.E.

Dr. Adedeji B. Badiru, PE, PMP, FIIE

PhD Industrial Engineering, University of Central Florida

Dean, Graduate School of Engineering and Management

Professor of Systems Engineering

Most Notable Publications

Badiru, A. B. (2022), Global Supply Chain: "Using Systems Engineering Strategies to respond to Disruptions," Taylor & Francis CRC Press, Boca Raton, FL.

Badiru, A. B. and Gary Lamont (2022), "Innovation Fundamentals: Quantitative and Qualitative Techniques," Taylor & Francis CRC Press, Boca Raton, FL.

Badiru, A. B. and Tina Agustiady (2021), "Sustainability: A Systems Engineering Approach to the Global Grand Challenge," Taylor & Francis CRC Press, Boca Raton, FL. Selected as Book-of-the-Month, *IISE Magazine*, June 2021.

Badiru, A. B. (2021), "Data Analytics: Handbook of Formulas and Techniques," Taylor & Francis CRC Press, Boca Raton, FL.

Badiru, A. B. (2020), "Innovation: A Systems Approach," Taylor & Francis CRC Press, Boca Raton, FL. Listed in Qualiware's 52 recommended Enterprise Architecture books from 2020 (https://www.qualiware.com/blog/52-books)

Badiru, A. B. (2019), "Project Management: Systems, Principles, and Applications, Second Edition," Taylor & Francis CRC Press, Boca Raton, FL.

Badiru, Adedeji B. (2021), "Quality Insight: Product Quality Certification post-COVID-19 Using Systems Framework from Academic Program Accreditation," *International Journal of Quality Engineering and Technology*, Vol 8, No. 2, pp. 218-227. DOI: 10.1504/IJQET.2021.113728.

Selected Honors & Awards

- 2022 Frederick Winslow Taylor Award, Highest Award from IEOM Society (Industrial Engineering and Operations Management), January 2022

- 2022 Career Achievement in Government Award, BEYA (Black Engineer of the Year) program

- 2020 Lifetime Achievement Award, Taylor and Francis/CRC Press, October 2020. Youtube video of award ceremony: https://www.youtube.com/watch?v=q0ltUSt4pcM

- 2016 Outstanding Global Engineering Education Award, Industrial Engineering and Operations Management (IEOM) award

- 2015 Air Force-level Winner of National Public Service Award, The American Society for Public Administration and the National Academy of Public Administration

- 2012 IIE Medallion Award, Institute of Industrial Engineers

Significant Accomplishments

- DEJI Systems Model® - Trademark for systems Design, Evaluation, Justification, and Integration

- Fellow of Industrial Engineering and Operations Management (IEOM) Society

- Fellow of Nigerian Academy of Engineering

- Fellow of Institute of Industrial & Systems Engineering (IISE)

- ABET Program Evaluator (PEV)

Research Interest Areas

Project engineering and management, data and computational analysis for learning curves, systems modeling for operational improvement, engineering economic analysis, supply chain optimization, innovation systems management, and organizational efficiency.

Dr. Bradley S. Liebst

PhD, Aeronautical Engineering, Massachusetts Institute of Technology

Department Head, Aeronautics & Astronautics Engineering

Professor of Aerospace Engineering

Most Notable Publications

B. S. Liebst, W. L. Garrard, and J. A. Farm, "Design of a Multivariable Flutter Suppression/Gust Load Alleviation System", *AIAA Journal of Guidance, Control, and Dynamics*, Vol. 11, No. 3, pp. 220-229, May-June 1988.

B. S. Liebst and P. Torvik, "Asymptotic Approximations for Systems Incorporating Fractional Derivative Damping", *ASME Journal of Dynamic Systems, Measurement, and Control*, Vol. 118, No. 3, pp. 572-579, September, 1996.

B. S. Liebst and R. Cobb, "Structural Damage Identification Using Assigned Partial Eigenstructure", *AIAA Journal*, Vol. 35, No. 1, January 1997, pp. 152-158.

B. S. Liebst and R. Cobb, "Sensor Placement and Structural Damage Identification From Minimal Sensor Information", *AIAA Journal*, Vol. 35, No. 2, February 1997, pp. 369-374.

B. S. Liebst, "The Dynamics, Prediction, and Control of Wing Rock in High-Performance Aircraft", *Philosophical Transactions of the Royal Society*, London, No. 356, 1998, pp. 2257-2267.

B. S. Liebst, Chapa, M., and Leggett, D., "Nonlinear Pre-Filter to Prevent Pilot-Induced Oscillations Due to Actuator Rate Limiting", *AIAA Journal of Guidance, Control and Dynamics*, Vol. 25, No. 4, July-August 2002, pp. 740-747.

Selected Honors & Awards

- AFIT Leadership Excellence Award (2014)

- Affiliate Societies Council of Dayton Educator of the Year Award (2014)

- Best Paper of the Year from the *Journal of Aerospace Engineering* (2002)

- Best Institute of Technology Professor at University of Minnesota (1987)

Research Interest Areas

- Eigenstructure assignment control
- Stability and control of aerospace vehicles
- Aircraft handling qualities
- Passive and active control of large flexible structures

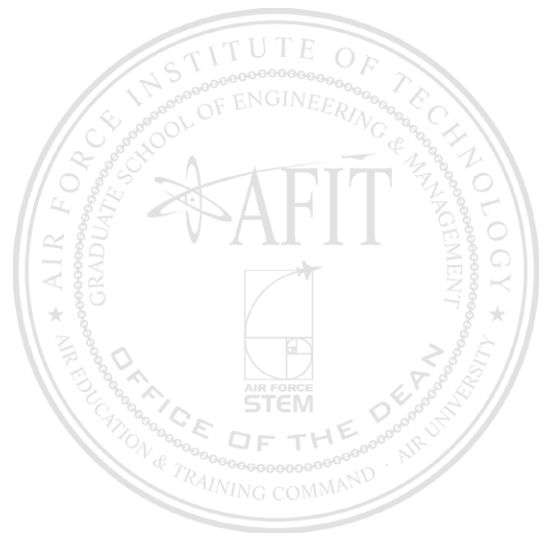# Dr. Bradley Ayres

PhD, Business Administration Specializing in MIS, Florida State University
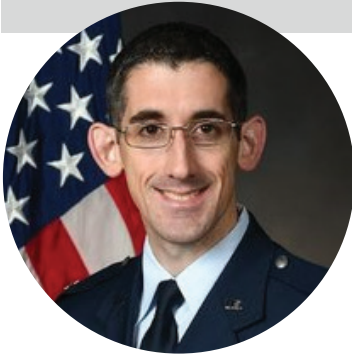
Assistant Professor of Aerospace Engineering

Research Interest Areas

- Complex systems
- Model-based systems engineering
- Space systems engineering

Maj Robert A. Bettinger

PhD, Astronautical Engineering, Air Force Institute of Technology

Deputy Director, Center for Space Research & Assurance

Assistant Professor of Astronautical Engineering

Most Notable Publications

Bettinger, R. A., "Atmospheric Reentry Hemisphere Prediction for Prograde Orbits Using Logical Disjunction," *Advances in Space Research*, Vol. 67, No. 10, May 2021, pp. 3267-3281.

Poole, C., **Bettinger, R. A.**, "'Black Space' versus 'Blue Space': A Proposed Dichotomy of Future Space Operations," *Air & Space Power Journal*, Vol. 35, No. 1, Spring 2021, pp. 4-18.

Boone, N. R., **Bettinger, R. A.**, "Spacecraft Survivability in the Natural Debris Environment near the Stable Earth-Moon Lagrange Points," *Advances in Space Research*, Vol. 67, No. 15, April 2021, pp. 2319-2332.

Poole, C., **Bettinger, R. A.**, "The Cosmic Sandbox: The Potential Military Role in Future Space Commerce and Exploration," *Space Force Journal*, Vol. 1, No. 1, January 2021.

Bettinger, R. A., "Linear Model for Reentry Time Prediction of Spacecraft in Low-Eccentricity, Low Earth Orbits," *Journal of Spacecraft and Rockets*, Vol. 56, No. 5, September-October 2019, pp. 1300-1311.

Selected Honors & Awards

- 2020 Graduate School of Engineering & Management (GSEM) Early Career Achievement Award

- 2020 AETC Outstanding Scientist/Engineer (Mid-Career Military)

- 2020 AETC Outstanding Scientist/Engineer Team of the Year (CSRA)

- 2019 General Muir S. Fairchild Education Achievement Award (CSRA)

- 2019 AFIT Innovation Award – Junior Faculty (Centennial Award Series)

- 2019 AU Nominee for Air Force Outstanding Scientist/Engineer (Mid-Career Military)

Research Interest Areas

- Atmospheric Re-entry
- Cislunar Trajectory and Mission Design
- Spacecraft Survivability
- Spacecraft Control and Navigation
- Space Law and Doctrine

Lt Col Brian T. Bohan

PhD, Aeronautical Engineering, Air Force Institute of Technology

Assistant Professor of Aeronautical Engineering

Most Notable Publications

Holobeny, D., **Bohan, B.T.**, and Polanka, M.D., "Computational and Experimental Analysis of a Compact Combustor Integrated into a JetCat P90 RXi." *Journal of Engineering for Gas Turbines and Power*, GTP-20-1832, Volume 143, Issue 9, Pages 091023 (8), Sept 21, DOI https://doi.org/10.1115/1.4051348

Staton, B.M., **Bohan, B.T.**, Polanka, M.D., and Goss, L.P., "Design, Analysis, and Manufacture of an Axial Length Saving Disk-Oriented Engine." *Journal of Engineering for Gas Turbines and Power*, GTP-20-1160, Volume 143, Issue 1, Pages 011001 (9), Jan 2021, DOI https://doi.org/10.1115/1.4048085

Claus, G.C., Hatton, A., **Bohan, B.T.**, and Polanka, M.D., "Internal Geometry and External Wall Effects on Fluidic Oscillator Behavior." *Journal of Fluids Engineering*, FE-20-1244, Volume 142, Issue 11, Pages 111212 (10), Nov 2020, DOI: 10.1115/1.4047849

Bohan, B.T., and Polanka, M.D., "Experimental Analysis of an Ultra Compact Combustor Powered Turbine Engine." *Journal of Engineering for Gas Turbines and Power*, GTP-19-1767, Volume 142, Issue 5, Pages 051014 (10), May 2020, DOI: 10.1115/1.4046759

Bohan B.T., Polanka M.D., "A New Spin on Small-Scale Combustor Geometry." *Journal of Engineering for Gas Turbines and Power*, GTP-18-1227, Volume 141 (1), 2018, DOI: 10.1115/1.4040658

Selected Honors & Awards

- 2021 - ASME IGTI Dilip R. Ballal Early Career Engineer of the Year

- 2021 - AIAA Special Service Citation

- 2020 - AFRL Aerospace Systems Directorate General Bernard P. Randolph Engineering Team Award

- 2019 - AFRL Turbine Engine Division Team of the Year (Responsive Open Source Engine (ROSE)

- 2019 - AFIT/ENY MOAA Outstanding Military Professor, #1/11 in Research Output

- 2016 - AFIT Student Field Grade Officer of the Quarter (#1/49)

- 2013 - Capt. Roland R. Obenland Annual Engineering Award 2012 (#1/158), Air Armament Center

- 2011 - AFIT Commandant's Award Winner – most exceptional master's thesis (#1/222)

- 2011 - AFIT Dean's Award Winner – most exceptional master's thesis in the Aero/Astro Dept. (#1/52)

- 2011 - American Institute of Aeronautics and Astronautics (AIAA) Research Excellence Award

- 2005 - Sigma Gamma Tau National Honor Society in Aerospace Engineering Inductee

Research Interest Areas

- Turbomachinery and Small Gas Turbine Engine Design
- Advanced Combustion Techniques
- Advanced materials and manufacturing processes of turbomachinery components
- Reduced or Eliminated Bleed Air Engine Cooling
- Unsteady Fluidic Devices
- Gas Turbine Engine Computational Modeling

Maj John S. Brewer Jr.

PhD, Aeronautical Engineering, Air Force Institute of Technology

Assistant Professor of Aerospace Engineering

Most Notable Publications

J. Brewer, A. Palazotto, J. Feie, C. Holycross, "Bearing Fatigue Response in Bolted Hybrid Composite Joints," *AIAA Scitech 2021 Forum*, https://doi.org/10.2514/6.2021-1402

M. Sherburne, C. Roberts, **J. Brewer**, T. Weber, T. Laurvick, and H. Chandrahalim, "Comprehensive Optical Strain Sensing Through the Use of Colloidal Quantum Dots," ACS *Applied Materials & Interfaces 2020* 12 (39), 44156-44162, DOI: 10.1021/acsami.0c1211

M. Sherburne, C. Roberts, **J. Brewer**, T. Weber, T. Laurvick, H. Chandrahalim, "Strain Sensing Using Colloidal Quantum Dots Integrated With Epoxy," *IEEE Sensors 2020*.

J. Brewer, A. Palazotto, J. Feie, M. Gran, "Bearing Response Characterization in Bolted Hybrid Composite Joints," Orlando, FL, *AIAA Scitech 2020 Forum*, https://doi.org/10.2514/6.2020-1928

J. Brewer, A. Palazotto, M. Falugi, "Optimization of the Bearing Stress of a Hybrid Composite," San Diego, CA, *AIAA Scitech 2019 Forum*, https://doi.org/10.2514/6.2019-0779

Selected Honors & Awards

- Best Session Presentation Award, 15th Annual Dayton Engineering Sciences Symposium

Research Interest Areas

- Composite and hybrid composite structures
- Aerospace materials evaluation
- Computational structural analysis
- Development of aerospace manufacturing

Dr. Richard G. Cobb

PhD, Astronautical Engineering, Air Force Institute of Technology

Professor Emeritus of Aerospace Engineering

Most Notable Publications

Livermore, R., Lindholm, G., Neal, C., **Cobb, R.** and Colombi, J., "Heuristic Near-Optimal UAS Path Planning for Convoy Overwatch", *Journal of Unmanned Aerial Systems*, Vol 2, No 1, 2016.

Humphreys, C., **Cobb, R.**, Jacques, R. and Reeger, J., "A Hybrid Technique to Rapidly Solve the Intermediate-Target Optimal Control Problem", *Global Journal of Technology & Optimization*, August 2016, DOI: 10.4172/2229-8711.1000200.

Denton, J., Hodson, D., **Cobb, R.**, Mailloux, L., Grimaila, M., and Baumgartner, G., "A Model to Estimate Performance of Space-Based Quantum Communication Protocols Including Quantum Key Distribution Systems", *Journal of Defense Modeling and Simulation (JDMS)*, Nov 2016.

Research Interest Areas

- Dynamics and control of aerospace systems, including control of aircraft, spacecraft, large flexible structures, and optical systems.

Recent work includes:

- Developing optimal trajectory plans for Global Strike missions
- Optimal aircraft air and ground collision avoidance algorithms for manned and unmanned systems
- Active buffet alleviation using piezoelectric actuators for F-16 aircraft

- Maneuver planning for satellite proximity operations
- Dynamics and control techniques for lightweight space optics and optimal/novel sensor systems
- Architectures for enhancing space situational awareness

Lt Col S. Darrell Crowe

PhD, Aeronautical Engineering, Air Force Institute of Technology

Assistant Professor of Aerospace Engineering

Most Notable Publications

Bills, J., **Crowe, D. S.**, Rutledge, J., and Coy, E. "Modeling Fuel Film Cooling on a Flat Plate", *Journal of Thermophysics and Heat Transfer*, Vol. 32, No. 3, pp. 736-746.

Crowe, D. S., Martin, C. L. "Hot Streak Characterization of High-Performance Double-Serpentine Exhaust Nozzles at Design Conditions", *Journal of Propulsion and Power*, Vol. 35, No. 3, pp. 501-511.

Crowe, D. S., Thornock, R. L., Brown, T. "Propulsion Aerodynamic Workshop IV: Modeling of the Jet From a High Aspect Ratio Rectangular Convergent Nozzle, With and Without an Aft Deck, at Pressure Ratios up to 3.5, Including a Comparison With Experimental Results (Invited)", *AIAA Paper* 2019-3927.

Crowe, D. S., Depaola, R. "A Method to Compute Thermal Distortion in Non-Circular Ducts", *AIAA Paper* 2019-1449.

Pung, J., **Crowe, D. S.** "Tracking Shock Movement on the Surface of an Oscillating, Straked Delta Wing", *AIAA Paper* 2019-2318.

Selected Honors & Awards

- American Institute of Aeronautics and Astronautics Associate Fellow, 2020

- Field Grade Officer of the Quarter, Air University, 2015, 2018

- Southwestern Ohio Council for Higher Education Faculty Excellence Award, 2015

Research Interest Areas

- Applied computational fluid dynamics
- Nozzle flows
- Store separation
- Weapons integration
- Advanced grid generation methods

Lt Col David H. Curtis

PhD, Astronautical Engineering, Air Force Institute of Technology

Assistant Professor of Aerospace Engineering

Most Notable Publications

Curtis, D. H., Reeder, M. F., Svanberg, C. E., and Cobb, R. G. "Flapping Wing Micro Air Vehicle Bench Test Set-up," *47th AIAA Aerospace Sciences Meeting*, Orlando FL, 2009.

Curtis, D. H., and Cobb, R. G. "Satellite Articulation Tracking Using Monocular Computer Vision," *AAS 41st Annual Guidance and Control Conference*, pages 1-13, Breckenridge, CO, 2018.

Curtis, D.H., and Cobb, R. G., "Satellite Articulation Tracking Using Computer Vision," *Journal of Spacecraft and Rockets* (2019), 1-14.

Selected Honors & Awards

- AFRL Nominee for Lance P. Sijan Leadership Award, 2010

- Meritorious Service Medal x 2

- Defense Meritorious Service Medal

Research Interest Areas

- Spacecraft rendezvous and proximity operations
- Orbital engagement maneuvers
- Spacecraft autonomous guidance
- Trajectory optimization
- On-orbit robotics
- Computer vision
- Stochastic estimation and control

Dr. Rama S. Gorla

PhD, Mechanical Engineering, University of Toledo

Professor of Aerospace Engineering

Most Notable Publications

Tripathi, J., Vasu, B., Dubey, A., **Gorla, R.S.R.**, Murthy, P.V.S.N., Anwar Beg, O. and Ponnaiah, S., "A review on Recent Advancements in the Hemodynamics of Nano-Drug Delivery Systems," *International Journal of Nanoscience and Technology*, 2020, DOI: 10.1615/Nanoscience Technology Int J/2020033448

Dubey, A., Vasu, B., Anwar Beg, O., **Gorla, R.S.R.** and Kadir, A., "Computational Fluid Dynamic Simulation of Two-Fluid Non-Newtonian Nanohemodynamics through a Diseased Artery with a Stenosis and Aneurysm," *Computer Methods in Biomechanics and Biomedical Engineering*, 2020, DOI: 10.1080/10255842.2020.1729755

Vasu, B., **Gorla, R.S.R.**, Murthy, P.V.S.N. and Anwar Beg, O., "Entropy Analysis of a Convective Film Flow of a Power-Law Fluid with Nanoparticles along an Inclined Plate," *Journal of Applied Mechanics and Technical Physics*, Vol. 60, 2019, pp. 1-15.

Siddiqa, S., Begum, N., Hossain, M.A., Shoaib, M. and **Gorla, R.S.R.**, "Radiative Heat Transfer Analysis of Non-Newtonian Dusty Casson Fluid Flow along a Complex Wavy Surface," *Numerical Heat Transfer*, Part A: Applications, 2018.

Begum, N., Siddiqa, S., Hossain, M.A. and **Gorla, R.S.R.**, "Natural Convection and Separation Points of a Non-Newtonian Fluid along a Rotating Round-Nosed Body," *AIAA Journal of Thermophysics and Heat Transfer*, 2018.

Selected Honors & Awards

- Life Fellow ASME

- Fenn Distinguished Research Professor, 2008

- Distinguished Technical Educator Award from Cleveland Technical Societies Council on May 17, 2006

- Distinguished Faculty Teaching Award from Cleveland State University in 2004

- Teaching Excellence Award from the Northeast Ohio Council on Higher Education in 2004

- Distinguished Faculty Research Award from Cleveland State University in 1999

Research Interest Areas

- Hypersonics
- Computational Fluid Dynamics
- Two Phase Flow
- Heat and Mass Transfer
- Turbomachinery
- Complex Fluids
- Reliability Analysis

Dr. Ramana V. Grandhi

PhD, Engineering Mechanics, Virginia Tech

Professor of Aeronautics and Astronautics

Most Notable Publications

Deaton, J.D., and **Grandhi, R.V.**, "A Survey of Structural and Multidisciplinary Continuum Topology Optimization: post 2000," *Journal of Structural and Multidisciplinary Optimization*, Vol. 49, 2014, pp. 1-38.

Park, I., and **Grandhi, R.V.**, "Quantifying Multiple Types of Uncertainty in Physics-based Simulation Using Bayesian Model Averaging," *AIAA Journal*, Vol. 49, No. 5, 2011, pp. 1038-1045.

Riley, M., and **Grandhi, R.V.**, "Quantification of Model-Form and Predictive Uncertainty for Multi-Physics Simulation," *Computers and Structures*, Vol. 89, Nos. 25-26, 2011, pp. 1206-1213.

Amarchinta, H.K., **Grandhi, R.V.**, Clauer, A.H., Langer, K., and Stargel, D., "Simulation of Residual Stress Induced by a Laser Peening Process through Inverse Optimization of Material Models," *Journal of Materials Processing Technology*, Vol. 210, No. 14, 2010, pp. 1997-2006.

Alyanak, E., **Grandhi, R.**, and Bae, H., "Gradient Projection for Reliability-based Design Optimization Using Evidence Theory," *Engineering Optimization*, Vol. 40, 2008, pp. 923-935.

Selected Honors & Awards

- American Society of Mechanical Engineers – ASME Fellow

- American Institute of Aeronautics and Astronautics – AIAA Fellow

- 2017 Mahatma Gandhi Pravasi Samman Award. Presented at the House of Lords, British Parliament, London, UK. NRI Welfare Society of India, representing 31 million Indians abroad.

- 2015 Distinguished Alumni Professional Achievement Award – given by the National Institute of Technology, Warangal, India.

- 2014 AIAA Sustained Service Award – given for conference leadership, significant publications, and leadership in technical committees. Presented in Washington, D.C.

- 2012 Outstanding Leadership Award – given by Wright State University College of Engineering and Computer Science for leadership of Ph.D. in Engineering Program.

Research Interest Areas

- Aerospace Structures and Design
- Multidisciplinary Design Optimization
- Hypersonics
- Aircraft Structures

DEPARTMENT OF AERONAUTICS & ASTRONAUTICS
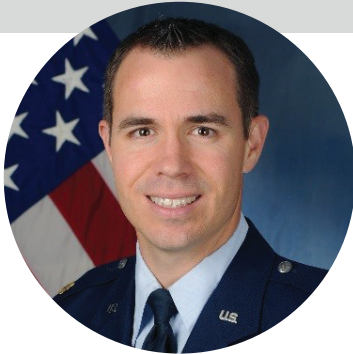
Maj John H. Hansen

PhD, Aerospace Engineering, University of Michigan

Assistant Professor of Aerospace Engineering

Most Notable Publications

J. H. Hansen, M. Duan, I. V. Kolmanovsky, and C. E. S. Cesnik, "Control Allocation for Maneuver and Gust Load Alleviation of Flexible Aircraft," *AIAA SciTech Forum*, January 2020, p. 1186.

M. Duan, **J. H. Hansen**, I. V. Kolmanovsky, and C. E. S. Cesnik, "Maneuver Load Alleviation of Flexible Aircraft through Control Allocation: A Case Study using X-HALE," *International Forum on Aeroelasticity and Structural Dynamics*, June 2019.

S. Usry, B. Sinclair, T. Brouze, C. Pinedo and **J. H. Hansen**, "Comparison of Flight Control Input Methods for Aerodynamic Parameter Estimation (HAVE PiTI)," *US Air Force Test Pilot School*, Dec 2013.

J. H. Hansen, T. Kameyama, "Formation Flight Control for Unmanned Aircraft using Swarm Control Principles," *Proceedings of International Conference on Unmanned Aircraft Systems*, Philadelphia PA, 2012.

M. Pachter, **J. H. Hansen**, D. Jacques and P. Blue, "Optimal Guidance of a Relay Aircraft to Extend Small Unmanned Aircraft Range," *International Journal of Micro Air Vehicles*, September 2010.

Selected Honors & Awards

- 2016 Field Grade Officer of the Year, Operations Group, Eglin AFB, FL

- 2011 Best Presentation for Poster Session, Technical Research and Development Institute Annual Symposium, Tokyo, Japan

- 2008 Best Presentation in Aircraft & Flow Control, Dayton-Cincinnati Aerospace Sciences Symposium, Dayton, OH

- 2007 - Sigma Gamma Tau National Honor Society in Aerospace Engineering Inductee

Significant Accomplishments

- Fluent Japanese Speaker 3/3 Defense Language Proficiency Test

Research Interest Areas

- Aircraft stability and control
- Aero-servo-elasticity and control

- Optimization

Dr. Carl R. Hartsfield

PhD, Astronautical Engineering, Naval Postgraduate School

Associate Professor of Aerospace Engineering

Most Notable Publications

Shelton, T, G. Cobb, **C. Hartsfield**, B. Doane, C. Eckley, R. Kemnitz, 2021, "The Impact of Laser Control on the Porosity and Microstructure of Selective Laser Melted Nickel Superalloy 718," *Results in Materials*. Volume 11, Sept 2021. DOI: (10.1016/j.rinma.2021.100211)

Eckley, C.C., Kemnitz, R.A., Fassio*, C.P., **Hartsfield, C.R.**, Leonhardt, T.A., 2021, "Selective Laser Melting of Tungsten-Rhenium Alloys," *Journal of Materials*. DOI: (10.1007/s11837-021-04776-x)

Hartsfield, C.R., Shelton, T.E., Cobb, G.R., Kemntiz, R.A., Weber, J., 2021, "Understanding Flow Characteristics in Metal Additive Manufacturing," *ASCE Journal of Aerospace Engineering*, Accepted 4 May 2021, DOI: (10.1061/(ASCE) AS.1943-5525.0001325)

Tommila, C.*, **C. Hartsfield**, J. Redmond*, J. Komives, T. Shelton, 2021, "Performance Impacts of Metal Additive Manufacturing of Very Small Nozzles," *ASCE Journal of Aerospace Engineering*, Vol. 34, No. 2. DOI: (10.1061/(ASCE) AS.1943-5525.0001229)

Crouch, S.*, **Hartsfield, C.**, 2020, "Triggered Lightning Threat Prediction Based on Launch Vehicle Parameters," *Journal of Defense Research and Engineering*, Volume 3, Issue 2, pp 39-50. (FOUO) (DTIC Accession number for issue: AD1101059)

Research Interest Areas

- Rocket Propulsion (chemical and electric)
- Spacecraft Design
- Additive Manufacturing

Selected Honors & Awards

- AFIT Category 4 Civilian of the Year, 2019

- AIAA Special Service Citation, 2018

- SOCHE Faculty Excellence in Teaching Award, 2017

Significant Accomplishments

- Program Chair for Graduate Space Systems Curriculum at AFIT

- Member of AIAA Small Satellites Technical Committee (2019-Present)

- Program Chair for Dayton Cincinnati Aerospace Sciences Symposium, 2018

Maj Ryan A. Kemnitz

PhD, Materials Science, Air Force Institute of Technology

Assistant Professor of Aerospace Engineering

Most Notable Publications

"Characterization of simulated low earth orbit space environment effects on acid-spun carbon nanotube yarns." **Kemnitz, R. A.**, Cobb, G. R., Singh, A. K., & Hartsfield, C. R. *Materials & Design*, Vol 184 (2019).
DOI: https://doi.org/10.1016/j.matdes.2019.108178

"Quantifying the effects of hyperthermal atomic oxygen and thermal fatigue environments on carbon nanotube sheets for space-based applications." Singleton, J. W., Cobb, G. R., Misak, H. E., & **Kemnitz, R. A.** *Results in Materials 3*, 100034 (2019).
DOI: https://doi.org/10.1016/j.rinma.2019.100034

"Mitigation of anisotropic fatigue in nickel alloy 718 manufactured via selective laser melting." Sabelkin, V. P., Cobb, G. R., Shelton, T. E., Hartsfield, M. N., Newell, D. J., O'Hara, R. P., & **Kemnitz, R. A.** *Materials & Design*, 182, 108095 (2019).
DOI: https://doi.org/10.1016/j.matdes.2019.108095

"Quantifying the effects of ultraviolet type C radiation on the mechanical and electrical properties of carbon nanotube sheet for space-based applications." Cobb, G. R., O'Hara, R. P., **Kemnitz, R. A.**, Sabelkin, V. P., & Doane, B. M. *Materials Today Communications*, 18, 7-13 (2019).
DOI: https://doi.org/10.1016/j.mtcomm.2018.10.016

"In-situ characterization of bulk carbon nanotube behavior in a sheet under tensile load." Singh, A. K., Cobb, G. R., & **Kemnitz, R. A.**, *Materials Today Communications*, 17, 493-500 (2019).
DOI: https://doi.org/10.1016/j.mtcomm.2018.10.017

Research Interest Areas

- Additive Manufacturing
- Carbon Nanotubes
- Materials Characterization

Dr. Andrew S. Keys

PhD, Electrical Engineering, University of Alabama in Huntsville

Associate Professor of Aerospace Engineering

Most Notable Publications

A. S. Keys and H. C. Morris (editors), "Marshall Space Flight Center Research and Technology Report 2017," NASA/TM-2018-2199582018, NASA MSFC, 2018.

A. S. Keys, M. L. Tinker and H. C. Morris (editors), "Marshall Space Flight Center Research and Technology Report 2015," NASA/TM-2016-218221, NASA MSFC, 2016.

A. S. Keys, M. L. Tinker, A.D. Sivak (editors), "Marshall Space Flight Center Research and Technology Report 2014," NASA/TM-2015-218204, NASA MSFC, 2015.

A. S. Keys, "Overview of the NASA ETDP RHESE Program," Chapter within *Extreme Environment Electronics*, editors J. D. Cressler and H. A. Mantooth, CRC Press, 2012.

A. S. Keys and R. L. Fork, "Full cycle, low loss, low distortion phase modulation from multilayered dielectric stacks with terahertz optical bandwidth," *Optics Express* [Online], Vol. 7, no. 9, pp. 311-322, 23 Oct. 2000.

Significant Accomplishments

- TEDxNashville, "Why Explore Space?" (Apr 2011), https://www.youtube.com/watch?v=VCULGeWtoLI

Research Interest Areas

- Development of sensors and detectors for the purpose of space-based remote sensing
- Electro-optics and photonic technologies
- Optical and laser systems
- Radiation hardening of avionics and electronics
- Advancement of related space technologies

Dr. Donald L. Kunz

PhD, Aerospace Engineering, Georgia Institute of Technology

Professor of Aerospace Engineering

Most Notable Publications

Kunz, D.L., *Intermediate Dynamics for Aeronautics & Astronautics*, Second Edition, Headmaster Press, ISBN: 978-1687350664, September 2019.

*Hope, D.N., and **Kunz, D.L.**, "Investigation of Shock Motion in Transonic Flow Using an Oscillating, Straked, Delta Wing," *AIAA Journal*, Vol. 57, No. 10, October 2019. DOI: http://arc.aiaa.org/doi/abs/10.2514/1.J057456. (JIF=1.080).

*Olsen, C.C., Kalyanam, K., Baker, W.P., and **Kunz, D.L.**, "Maximal Distance Discounted & Weighted Revisit Period: A Utility Approach to Persistent Unmanned Surveillance," *Unmanned Systems*, Vol. 7, No. 4, July 2019, pp. 1-18. http://doi.org/10.1142/S2301385019500079.

*Kim, J.P. and **Kunz, D.L.**, "Handling Qualities Assessment of an Unmanned Aircraft Using Performance and Workload Metrics," *Journal of Guidance, Control and Dynamics*, Vol 40, No. 10, October 2017, pp. 2701-2709. DOI: http://arc.aiaa.org/doi/abs/10.2514/1.G002306 (JIF=1.651)

*Tauer, T.M., **Kunz, D.L.** and Lindsley, N.J., "Visualization of Nonlinear Aerodynamic Phenomena During F-16 Limit-Cycle Oscillation," *Journal of Aircraft*, Vol. 53, No. 3, May-June 2016, pp. 865-870. DOI: http://arc.aiaa.org/doi/abs/10.2514/1.C033534 (JIF=0.632)

Selected Honors & Awards

• Distinguished Service Award, American Institute of Aeronautics & Astronautics (2006)

• Leadership Award, American Institute of Aeronautics & Astronautics (2004)

Significant Accomplishments

• Professional Engineer (ME) Commonwealth of Virginia

Research Interest Areas

• Rotorcraft aeromechanics
• Aeroelasticity
• Structural dynamics
• Dynamics
• UAV handling qualities

Lt Col Bryan D. Little

PhD, Astronautic Engineering, Purdue University

Deputy Department Head

Assistant Professor of Astronautical Engineering

Most Notable Publications

Vasso, A., Cobb, R., Colombi, J., **Little, B.** and Meyer, D. (2021), "Augmenting the space domain awareness ground architecture via decision analysis and multi-objective optimization," *Journal of Defense Analytics and Logistics*, Vol. 5 No. 1, pp. 77-94. https://doi.org/10.1108/JDAL-11-2020-0023

Little, B. D., Frueh, C. E. "Multiple Heterogeneous Sensor Tasking Optimization in the Absence of Measurement Feedback," *The Journal of the Astronautical Sciences* (2020). https://doi.org/10.1007/s40295-020-00232-1

Little, B. D., Frueh, C. E. (2020). "Space situational awareness sensor tasking: Comparison of machine learning with classical optimization methods," *Journal of Guidance, Control, and Dynamics*, 43(2), 262–273. https://doi.org/10.2514/1.G004279

R. A. Bettinger, N. Boone, N. S. Hamilton and **B. D. Little**, "Spacecraft Charging Vulnerability near the Stable Earth-Moon Lagrange Points," *2021 IEEE Aerospace Conference* (50100), 2021, pp. 1-9, DOI:10.1109/AERO50100.2021.9438151

Knister, S., Williams, B. R., Hayhurst, D., Johnson, K. W., **Little, B. D.**, "Evaluation Framework for Cislunar Space Domain Awareness Systems," *American Astronautical Society Paper* 21-520, August 2021.

Research Interest Areas

- Sensor Tasking for Space Situational Awareness
- Astrodynamics
- Cis-Lunar Orbit Design
- Space Based Electro-Optical Sensor Systems

Lt Col Robert B. MacDermott

PhD, Astronautical Engineering, Air Force Institute of Technology

Assistant Professor of Aerospace Engineering

Most Notable Publications

MacDermott, R., Greendyke, R., Temme, N., Morgan, R., and McIntyre, T., "An Experimental Analysis of Hypersonic Carbon-Carbon Ablation in Representative-Wake Expansion Regions," *JANNAF Journal of Propulsion and Energetics*, Vol 12, Issue 1, 2021.

MacDermott, R., Greendyke, R., Temme, N., Morgan, R., and McIntyre, T., "Experimental Analysis of Hypersonic Carbon-Carbon Ablation in Representative-Wake Expansion Regions," *38th Exhaust Plume and Signatures Meeting (JANNAF)*, 2020-0006N, Virtual Meeting, December 2020.

MacDermott, R., and Greendyke, R., "Experimental Analysis of Gas-Surface Interactions with Ablating Material," *2020 National Space and Missile Materials Symposium*, Virtual Meeting, June 2020.

Selected Honors & Awards

- Air Force Materiel Command Special Programs Awards, Military Systems Engineer of the Year, 2015

Research Interest Areas

- Hypersonics
- Aerothermodynamics
- Computational Fluid Dynamics
- Nonequilibrium Flows
- Gas Surface Interactions
- Radiative Emissions

Dr. Anthony N. Palazotto

PhD, Solid Mechanics, New York University

Distinguished Professor of Aerospace Engineering

Most Notable Publications

More than 255 archival and over 450 presentations

Deleon, A., Baker, W. and **Palazotto, A.**, "Modeling a Nonlinear Melt Region as a Result of High-Speed Sliding," *Journal of Thermophysics and Heat Transfer*, Vol. 33, No. 3, July-September, 2019.

You, C., **Palazotto, A.**, and Buentello, R., "Evaluation of Thermomechanical Damage of a Slipper and Rail in a Rocket Sled System," *Journal of Testing and Evaluation*, Vol. 44, No. 4, pp 1443-1453, 2016.

Just, L., Deluca, A., and **Palazotto, A.**, "Nonlinear Dynamic Analysis of an Icosahedron Frame Which Exhibits Chaotic Behavior," *ASME Journal of Computational and Nonlinear Dynamics*, Vol. 12, pp 011006-1-10, January, 2017.

Abid, N, Abu-Al-Rub, R., and **Palazotto, A.**, "Micromechanical Finite Element Analysis of the Effects of Martensite Morphology on the Overall Mechanical Behavior of Duel Phase Steel," *International Journal of Solids and Structures*, Vol. 104-105, pp 8-24, 2017.

Easterday, O., **Palazotto, A.**, Baker, W., and Branam, R., "Damping Properties of Coatings at Elevated Temperatures," *Surface and Coatings Technology*, Vol. 321, pp 186-199, 2017.

Selected Honors & Awards

- Nominated for AIAA honorary Fellow, National Acadamy of Engineering (NAE), and Crichlow Award

- AIAA Achievement Award (2004)

- Structures, Structural Dynamics and Material Award, ASCE (1986)

- Hetanyi Award, Society of Experimental Mechanics, (1982)

- Cleary Award, Air Force Material Lab (1981)

Significant Accomplishments

- Fellow in AIAA, ASCE, Engineering Mechanics Institute, and American Academy of Mechanics

Research Interest Areas

- Nonlinear mechanics
- Shell analysis
- Finite elements

- Composite materials
- Viscoplasticity
- Nonlinear dynamics

Dr. Marc D. Polanka

PhD, Mechanical Engineering, University of Texas-Austin

Professor of Aeronautical Engineering

Most Notable Publications

Over 125 conference papers and over 55 peer-reviewed journal articles

Polanka, M.D., Rutledge, J.L., Bogard, D.G., and Anthony, R.J., "Determination of Cooling Parameters for a High Speed, True Scale, Metallic Turbine Vane Ring," *Journal of Turbomachinery*, Vol. 139(1), pg 011001 1:9, 2017. DOI: 10.1115/1.4033974

Wiese, C.J., Rutledge, J.L., **Polanka, M.D.**, "Experimental Evaluation of Thermal and Mass Transfer Techniques to Measure Adiabatic Effectiveness with Various Coolant to Freestream Property Ratios," *Journal of Turbomachinery*, Vol. 140 (2), pg 021001 1:9, Feb 2018. DOI: 10.1115/1.4038177. **ASME Best Paper Award – Heat Transfer**.

Ausserer, J.K., **Polanka, M.D.**, Baranski, J.R and. Litke, P.J., "Mapping of Fuel Anti-Knock Requirements for a Small Remotely Piloted Aircraft Engine", *SAE Int. Journal of Aerospace* 12(1): June 2019, pg 1-17. DOI: 10.4271/2016-32-0045. **SAE Manly Award Winner for Best Paper.**

Huff, R., **Polanka, M.D.**, McClearn, M.J., Schauer, F.R, Fotia, M.L., Hoke, J.L., "Design and Operation of a Radial Rotating Detonation Engine," *Journal of Propulsion and Power*, Vol. 35, No. 6, 2019, pp. 1143-1150.

Bohan, B.T. and **Polanka, M.D.**, "Experimental Analysis of an Ultra-Compact Combustor Powered Turbine Engine," *Journal of Engineering for Gas Turbines and Power*, Vol. 142 (5) pg. 051014 1-10, May 2020.

Selected Honors & Awards

- Air Force Outstanding Science and Engineering Educator Award, 2019
- AFIT/EN Distinguished Teaching Professor, 2019
- AFIT Innovation Award, Senior Faculty, 2019
- AETC AF Outstanding Scientist/Engineer, Senior Civilian, 2017
- AIAA Sustained Service Award, 2017
- AFIT Faculty Administrative Fellow, 2016
- AFIT Civilian Category III of the Year, 2015
- AIAA Outstanding Section Award, Very Large Category, 1st Place, 2011, 2012, and 2018
- AFIT Charles P. Brothers Award for Outstanding Volunteer Service, 2010

Significant Accomplishments

- Fellow, American Society of Mechanical Engineers (ASME)
- Associate Fellow, American Institute of Aeronautics (AIAA)
- Chair of the AIAA Associate Fellow Committee (2018-2021)
- Chair of the ASME K-14 Heat Transfer Committee (2020-2022)

Research Interest Areas

- Ultra compact combustor development
- Film cooling of turbine airfoils
- Rotating detonation engines
- Internal combustion engines
- Scramjets

Dr. Mark F. Reeder

PhD, Mechanical Engineering, Ohio State University

Professor of Aerospace Engineering

Most Notable Publications

Probst, Z., **Reeder, M.**, Johnson, R., and Grove J., "Flight-Test Experiments on Cavity Flow in an SUU- 41 Pod," *Journal of Aircraft*, Vol. 54, No. 5, September 2017, pp. 1814-1824.

Seney, S.D., Huffman, R.E., Bailey, W., Liu, D., **Reeder, M.F.**, and Stults, J. "Improving Performance of a Sliding Dielectric Barrier Discharge Actuator Using Multiple Potentials", *AIAA Journal*, Vol. 54 (10), October 2016, pp. 3316-3319.

Merrick, J. & **Reeder, M.F.**, "Sphere Release from a Rectangular Cavity at Mach 2.22 Freestream Conditions," *AIAA Journal of Aircraft*, Vol. 53, No. 3, May-June 2016, pp. 822-829.

Cleaver, T.A., Gutman, A.J., Martin, C.L., **Reeder, M.F.** & Hill, R.R., "Using design of experiments methods for applied computational fluid dynamics: A case study," *Quality Engineering*, Vol. 28 (3), May 2016, pp. 280-292.

Callaway, D., **Reeder, M.**, Greendyke, R., and Gosse, R., "Measurement and Analysis of Ablation of Solid Carbon Dioxide exposed to a Mach 3 Flow," *AIAA Journal of Spacecraft and Rockets*, Vol. 51, No. 1, January 2014, pp. 213-225.

Significant Accomplishments

- Co-author of 43 refereed journal publications and 4 U.S. patents.

- AIAA Associate Fellow

- Member of the American Society of Mechanical Engineering

- Licensed Professional Engineer (State of Ohio)

Research Interest Areas

- Fluid Dynamics
- Air Vehicle Design
- Aerodynamic Measurement Techniques

Dr. Marina B. Ruggles-Wrenn

PhD, Mechanical Engineering, Rensselaer Polytechnic Institute

Professor of Aerospace Engineering

Most Notable Publications

S. J. Robertson, **M. B. Ruggles-Wrenn**, R. S. Hay, T. Shillig, R. Mitchell, B. Kroeger, L. Gumucio, "Static fatigue of Hi-Nicalon™-S fiber at elevated temperature in air, steam and silicic-acid-saturated steam", *Journal of the American Ceramic Society*, DOI: 10.1111/jace.16799.

M. B. Ruggles-Wrenn and T. A. Wallis, "Creep in interlaminar shear of an Hi-Nicalon™/SiC-B4C composite at 1300°C in air and in steam", *Journal of Composite Materials*, https://doi.org/10.1177/0021998319886621.

M. B. Ruggles-Wrenn, S. N. Minor, C. P. Przybyla, and E. L. Jones, "Creep of a Nextel™720/alumina ceramic composite containing an array of small holes at 1200°C in air and in steam", *International Journal of Applied Ceramic Technology*, Vol. 16, 2019, pp. 3-13.

M. B. Ruggles-Wrenn and M. Noomen, "Fatigue of unitized polymer/ceramic matrix composites with 2D and 3D fiber architecture at elevated temperature", *Polymer Testing*, Vol. 72, 2018, pp. 244-256.

M. B. Ruggles-Wrenn, N. J. Boucher and C. P. Przybyla, "Fatigue of three advanced SiC/SiC ceramic matrix composites at 1200°C in air and in steam", *International Journal of Applied Ceramic Technology*, Vol. 15, 2018, pp. 3-15.

Selected Honors & Awards

- Board of Governors Award, ASME (2016)

- Stinson Trophy, NAA (2015)

Significant Accomplishments

- Fellow, American Society of Mechanical Engineers (ASME)

Research Interest Areas

- Material behavior in extreme environments
- Advanced structural materials
- Composite materials and structures
- High-temperature structural design methods
- Viscoplasticity – constitutive modeling

Lt Col James L. Rutledge

PhD, Aeronautical Engineering, Air Force Institute of Technology

Associate Professor of Aeronautical Engineering

Most Notable Publications

Fischer, J.P., McNamara, L.J., **Rutledge, J.L.**, Polanka, M.D., 2020, "Scaling Flat-Plate, Low-Temperature Adiabatic Effectiveness Results Using the Advective Capacity Ratio," *Journal of Turbomachinery*.

Bryant, C.E. and **Rutledge, J.L.**, 2020, "A Computational Technique to Evaluate the Relative Influence of Internal and External Cooling on Overall Effectiveness," *Journal of Turbomachinery*.

Rutledge, J.L., Baker, W.P., 2018, "Unsteady Effects on the Experimental Determination of Overall Effectiveness," *Journal of Turbomachinery*.

Wiese, C.J., **Rutledge, J.L.**, Polanka, M.D., 2018, "Experimental Evaluation of Thermal and Mass Transfer Techniques to Measure Adiabatic Effectiveness with Various Coolant to Freestream Property Ratios," *Journal of Turbomachinery*, Vol. 140, No. 2.

Bills, J.D., Crowe, D.S., **Rutledge, J.L.**, Coy, E.B., 2018, "Modeling Fuel Film Cooling on a Flat Plate," *Journal of Thermophysics and Heat Transfer*, Vol. 32, No. 3.

Selected Honors & Awards

- 2021 U.S. Air Force Outstanding Science & Engineering Educator
- 2020 ASME Turbo Expo Best Paper (Heat Transfer)
- 2019 ASME Turbo Expo Best Paper (Heat Transfer)
- 2018 AFIT Outstanding Military Faculty
- 2017 ASME Turbo Expo Best Paper (Heat Transfer)

Significant Accomplishments

- Fellow, American Society of Mechanical Engineers (ASME)
- AFIT Senior Military Faculty

  Professional Engineer, State of Texas
- U.S. Patent No. 10,648,882 B2, "Wind Tunnel Wake Generator"
- U.S. Patent No. 9,316,547 B1: "A Method to Determine Time-Resolved Waveforms of Periodic Unsteady Heat Transfer Coefficient and Adiabatic Wall Temperature"

Research Interest Areas

- Fluid dynamics
- Heat transfer
- Propulsion

Dr. Fred Schauer

PhD, Mechanical Engineering, University of Illinois at Urbana-Champaign

Associate Professor of Aeronautical Engineering

Most Notable Publications

"T63 Turbine Response to Rotating Detonation Combustor Exhaust Flow", A. Naples; J. Hoke; R. Battelle; **F. Schauer**, GTP-18-1424, *J. Eng. Gas Turbines Power*, Vol 141 (2), Feb 2019.

"Thermodynamic Model of a Rotating Detonation Engine," C.A. Nordeen, D. Schwer, **F. Schauer**, J. Hoke, T.H. Barber, and B. Cetegen, *Combustion, Explosion, and Shock Waves*, Vol 50 (5), Sept 2014.

"Petroleum-based and Bio-derived Jet Fuel Efficiency Optimization Using Fuel Injection in a 34cc 4-Stroke Spark Ignition Engine," C. Wilson, **F. Schauer**, P. Litke, J. Hoke, and J.R. Groenewegen, *SAE 2011-11-08*.

"Detonation Initiation and Performance in Complex Hydrocarbon Fueled Pulsed Detonation Engines," **F. Schauer**, J. Stutrud, R. Bradley, V. Katta, and J. Hoke, *50th JANNAF Propulsion Meeting*, paper I-05, 2001.

"Stealing the Moon", **F. Schauer**, *AFRL INSPIRE Lecture*, https://www.youtube.com/watch?v=LWWzdJ6CUIE, 2016.

Selected Honors & Awards

- Air Force Research Laboratory Innovator of the Year (2011)

- Finalist for Collier Trophy (2009)

- American Institute of Aeronautics Engineer of the Year (2009)

- Air Force Scientist of the Year (2008)

Significant Accomplishments

- Fellow, Air Force Research Laboratory (AFRL)

- Associate Fellow, American Institute of Aeronautics (AIAA)

- AFOSR Star Team (2012-2014; 2006-2008)

Research Interest Areas

- Energy, propulsion, and power – particularly novel cycles.

Lt Col Michael M. Walker

PhD, Aerospace Engineering, The Ohio State University

Assistant Professor of Aerospace Engineering

Most Notable Publications

Walker, M.M., Hipp, K.D., Benton, S.I., and Bons, J.P., "Effect of Jet Spacing on Swept-Wing Leading-Edge Separation Control," *AIAA Journal*, July 2018, Vol. 56: 2907-2910, DOI: 10.2514/1.J056352

Walker, M.M., and Bons, J.P., "The Effect of Passive and Active Boundary-Layer Fences on Swept-Wing Performance at Low Reynolds Number," *2018 AIAA Aerospace Sciences Meeting*, January 2018. DOI: 10.2514/6.2018-0793

Walker, M.M., "Replicating the Effects of a Passive Boundary-Layer Fence via Active Flow Control," *PhD Dissertation*, The Ohio State University, March 2018.

Hipp, K.D., **Walker, M.M.**, Benton, S.I., and Bons, J.P., "Control of Poststall Airfoil Using Leading-Edge Pulsed Jets," *AIAA Journal*, February 2017, Vol. 55: 365-376, DOI: 10.2514/1.J055223

Walker, M.M., Hipp, K.D., and Bons, J.P., "The Role of Spanwise Flow for Swept Wing Separation Control with Varied Spanwise Jet Spacing," *2016 AIAA Applied Aerodynamics Conference*, June 2016. DOI: 10.2514/6.2016-3120

Selected Honors & Awards

- 2008 – Company Grade Officer of the Quarter (of 105), National Air & Space Intelligence Center

- 2011 – Senior Company Grade Officer of the Quarter (of 427), Space & Missile Center

- 2007 – Nominated to Sigma Gamma Tau – National Aerospace Engineering Honor Society

- 2003 – Outstanding Academic Performer, Air & Space Basic Course

Research Interest Areas

- Aerodynamics
- Swept-wing performance
- Active flow control
- Experimental and computational fluid mechanics

Dr. William E. Wiesel

Ph.D., Harvard University, Astronomy

Professor Emeritus of Aerospace Engineering

Most Notable Publications

"Estimating Nongravitational Accelerations on High Area-to-Mass Ratio Objects", **W. E. Wiesel**, *Journal of Guidance*, Control, and Dynamics, 39, 1438-1443, 2016.

"A KAM Tori Algorithm for Earth Satellite Orbits", **W. E. Wiesel**, *Journal of the Astronautical Sciences*, 64, 46-62, 2017.

"Stochastic Dynamics of and Collision Prediction for Low Altitude Earth Satellites", Adam T. Rich, Kenneth J. Stuart, **William E. Wiesel**. *Journal of the Astronautical Sciences*; Sept 2018; 65; 3; p307-p320.

"Impulsive Control of Earth Satellites on Low-Eccentricity KAM Tori", Christopher T. Craft and **William E. Wiesel**, accepted by the *Journal of Guidance, Control, and Dynamics*, 2019.

Significant Accomplishments

Author of three widely-regarded texts on spacecraft and orbital dynamics:

- Spaceflight Dynamics
- Modern Astrodynamics
- Modern Orbit Determination

Research Interest Areas

- Orbital mechanics, especially the application of the KAM theorem to orbital systems
- Dynamical system theory
- Control and estimation
- Control of time dependent nonlinear systems

- Satellite cluster navigation
- Mission planning
- Past research interests have included solar system orbital dynamics and planetary astronomy

Maj Costantinos Zagaris

PhD, Astronautical Engineering, Naval Postgraduate School

Assistant Professor of Astronautical Engineering

Most Notable Publications

C. Zagaris and M. Romano, "Reachability Analysis of Planar Spacecraft Docking with Rotating Body in Close Proximity", *Journal of Guidance, Control, and Dynamics*, Vol. 41, No. 6, pp. 1416-1422, Jan. 2018.

C. Zagaris, H. Park, J. Virgili-Llop, R. Zappulla II, M. Romano, and I. Kolmanovsky, "Model Predictive Control of Spacecraft Relative Motion with Convexified Keep-Out-Zone Constraints", *Journal of Guidance, Control, and Dynamics*, Vol. 41, No. 9, pp 2051-2058, Sep. 2018.

J. Virgili-Llop, **C. Zagaris**, R. Zappulla II, A. Bradstreet, and M. Romano, "A convex programming-based guidance algorithm to capture a tumbling object on-orbit using a spacecraft equipped with a robotic manipulator", *International Journal of Robotics Research*, Vol. 38, No.1, pp. 40-72, Jan. 2019.

J. Virgili-Llop, **C. Zagaris**, H. Park, R. Zappulla II and M. Romano, "Experimental evaluation of model predictive control and inverse dynamics control for spacecraft proximity and docking maneuvers," *CEAS Space Journal*, Vol. 10, No. 1, pp. 37–49, May 2017.

Selected Honors & Awards

- Best Astrodynamics paper, AIAA SciTech Forum & Expo, Jan 2019

- AFIT Distinguished Graduate, Mar 2012

Research Interest Areas

- Autonomous spacecraft guidance and control
- Optimal control
- Reachability analysis
- Robotics
- Autonomous multi-agent systems

Lt Col Michael D. Zollars

PhD, Aeronautical Engineering, Air Force Institute of Technology

Assistant Professor of Aeronautical Engineering

Most Notable Publications

Michael D. Zollars, Richard G. Cobb, and David J. Grymin. "Optimal SUAS Path Planning in Three-Dimensional Constrained Environments." *Unmanned Systems*, 7(2), (2019), pp.105-118, DOI:10.1142/S2301385019500031

Michael D. Zollars, Richard G. Cobb, and David J. Grymin. "Optimal Path Planning for Unmanned Aircraft Target Observation Through Constrained Urban Environments." *Journal of Air Transportation*, 27(3), (2019), DOI:10.2514/1.D0141

M. D. Zollars, R. G. Cobb and D. J. Grymin, "Optimal Path Planning for SUAS Waypoint Following in Urban Environments," *2018 IEEE Aerospace Conference*, Big Sky, MT, 2018, pp. 1-8, DOI: 10.1109/AERO.2018.8396483

M. D. Zollars, R. G. Cobb and D. J. Grymin, "Simplex Optimal Control Methods for Urban Environment Path Planning," *AIAA Sci-Tech Information Systems Conference*, Orlando, FL, 2018, pp. 1-16, DOI: 10.2514/6.2018-2259

M. D. Zollars, R. G. Cobb and D. J. Grymin, "Simplex Methods for Optimal Control of Unmanned Aircraft Flight Trajectories," *ASME Dynamic Systems and Controls Conference*, Tysons Corner, VA, 2017, pp. 1-10, DOI: 10.1115/DSCC2017-5031

Research Interest Areas

- Optimal control theory
- Autonomous aircraft guidance and control
- Trajectory optimization
- Aircraft stability and control
- Dynamics
- Estimation theory

Dr. Kenneth M. Hopkinson

PhD, Computer Science, Cornell University

Department Head, Electrical & Computer Engineering

Professor of Computer Science

Most Notable Publications

Heglund, J., **Hopkinson, K.**, Tran, H.T., "Social Sensing: Towards Social Media as a Sensor for Resilience in Power Systems and Other Critical Infrastructures," *Taylor and Francis Journal of Sustainable and Resilient Infrastructure*, 12 March 2020, pp. 1-13.

Becherer, N., Pecarina, J., Nykl, S., **Hopkinson, K.**, "Improving Optimization of Convolutional Neural Networks through Parameter Fine-tuning," *Springer Neural Computing and Applications*, Volume 31, Issue 8, August 2019, pp. 3469-3479.

Compton, A.J., Pecarina, J.M., **Hopkinson, K.M.**, Lin, A.C., "PeerAppear: A Self-Organizing Distributed Geospatial Index Supporting Collaborative World Model Construction and Maintenance," *Elsevier Future Generation Computer Systems*, Volume 95, June 2019, pp. 802-815.

Greve, G.H., **Hopkinson, K.M.**, Lamont, G.B., "Evolutionary Sensor Allocation for the Space Surveillance Network," *Journal of Defense Modeling and Simulation*, Volume 15, Issue 3, July 2018, pp. 303-322.

Hamman, S.T., **Hopkinson, K.M.**, Fadul, J.E., "A Model Checking Approach to Characterizing the Fault Tolerance of Smart Grid Protection Systems," *IEEE Transactions on Power Delivery*, Volume 32, Issue 6, December 2017, pp. 2408-2415.

Selected Honors & Awards

- 2014 AFIT Winner and Air Education and Training Command (AETC) Runner-Up for the Educator of the Year Award

- 2010 Air Education and Training Command (AETC) Junior Civilian Scientist of the Year

- Institute of Electrical and Electronics Engineers (IEEE) Senior Member

- Association for Computing Machinery (ACM) Senior Member

Research Interest Areas

- Networking
- Security
- Cryptography
- Remote Sensing

- Sensor Fusion
- Critical Infrastructure Protection
- Space Applications
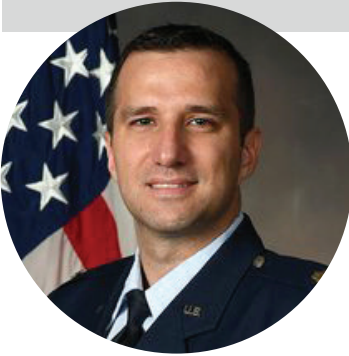
Maj David J. Becker

PhD, Electrical Engineering, Air Force Institute of Technology

Assistant Professor of Electrical Engineering

Most Notable Publications

David Becker and Stephen Cain, "Improved space object detection using short-exposure image data with daylight background," *Applied Optics 57*, 3968-3975 (2018).

D. Becker and S. Cain. "Improving space object detection using a Fourier like-lihood ratio detection algorithm," in *SPIE Optics + Photonics*, International Society for Optics and Photonics, 2016.

D. Becker and S. Cain. "A Space Object Detection Algorithm using Fourier Domain Likelihood Ratio Test," *Advanced Maui Optical and Space Surveillance Technologies Conference*, 2017.
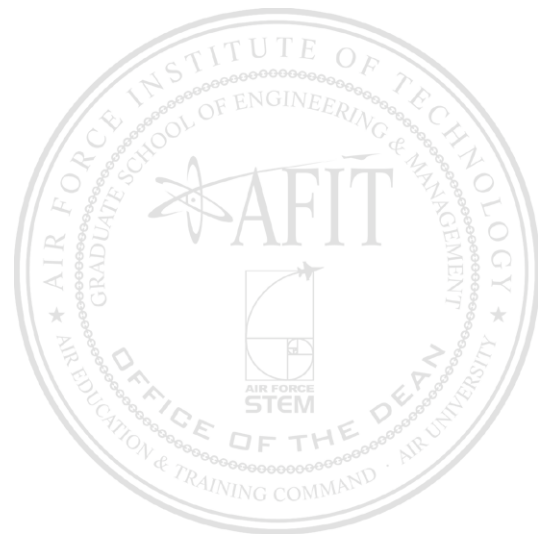
Dr. Brett J. Borghetti

PhD, Computer Science, University of Minnesota, Twin Cities

Associate Professor of Computer Science

Most Notable Publications

Westing, Nicholas M., **Borghetti, Brett**, J., Gross, Kevin C., "Fast and Effective Techniques for LWIR Radiative Transfer Modeling: A Dimension Reduction Approach", *Remote Sensing (MDPI)*, 9 Aug 2019, Vol 11, issue 6, pp. 1866-1886, DOI: 10.3390/rs11161866 https://www.mdpi.com/2072-4292/11/16/1866/htm

Dickey, Joshua T., **Borghetti, Brett J.**, and Junek, William, "Improving Regional and Teleseismic Detection for Single-Trace Waveforms Using a Deep Temporal Convolutional Neural Network Trained with an Array-Beam Catalog", *Sensors (MDPI)*, 31 Jan 2019, Vol 19, issue 3, pp 597-618, DOI: 10.3390/s19030597 https://www.mdpi.com/1424-8220/19/3/597

Hefron, Ryan G., **Borghetti, Brett J.**, Christensen, James C., Schubert Kabban, Christine M., "Deep long short-term memory structures model temporal dependencies improving cognitive workload estimation," *Pattern Recognition Letters (IEEE)*, Vol 94, 15 July 2017, pp 96-104. https://www.sciencedirect.com/science/article/pii/S0167865517301678

Borghetti, B.J., Giametta, J.J., & Rusnock, C.F., "Assessing Continuous Operator Workload with a Hybrid Scaffolded Neuroergonomic Modeling Approach," *Human Factors*, Vol 59, No. 1, Feb 2017, pp 134-146. DOI: 10.1177/0018720816672308 http://journals.sagepub.com/doi/abs/10.1177/0018720816672308

Sodemann, A.A., Ross, M.P., and **Borghetti, B.J.**, "A Review of Anomaly Detection in Automated Surveillance", *IEEE Transactions on System, Man, and Cybernetics Part C*, Vol. 42, No. 6, November 2012, pp 1257-1272. DOI: 10.1109/TSMCC.2012.2215319 https://ieeexplore.ieee.org/document/6392472

Selected Honors & Awards

- Human Factors and Ergonomics Society Conference Best Paper Award (2017)

- Human Factors and Ergonomics Society Conference Best Paper Award (2016)

- AETC Nominee to AF: AF STEM Outstanding Science and Educator Award (2014)

Research Interest Areas

- Improving human-machine team performance in complex environments using artificial intelligence and machine learning.

- Research experience in estimating human cognitive performance, seismic signal analysis, hyperspectral imagery analysis, statistical machine learning, genetic algorithms, self-organizing systems, neural networks, game theory, information theory and cognitive science.

Dr. Stephen C. Cain

PhD, Electrical Engineering, University of Dayton

Associate Professor of Electrical Engineering

Most Notable Publications

Nicholas J. Yielding, **Stephen C. Cain**, Michael D. Seal, "Statistical photocalibration of photodetectors for radiometry without calibrated light sources," *Opt. Eng.*, Vol. 57 no. (1) DOI: 014107 (25 January 2018).

David Becker and **Stephen C. Cain**, "Improved space object detection using short- exposure image data with daylight background", *Applied Optics*, Vol. 57, Issue 14, pp. 3968-3975 (2018).

Stephen Cain and Tatsuki Watts, "Non-Paraxial Fourier propagation tool for aberration analysis and point spread function calculation", *Optical Engineering*, Vol. 55, Issue 8, DOI: 10.1117/1.OE.55.8.085104, (2016).

Tyler Hardy, Travis Blake, and **Stephen Cain**, "Unequal a priori probability multiple hypothesis testing in space domain awareness with the space surveillance telescope", *Applied Optics*, Vol. 55, Issue 15, pp. 4036-4046, (2016).

Richard D. Richmond and **Stephen C. Cain**, *Direct Detection LADAR Systems*, SPIE press, Bellingham, WA, 2010.

Research Interest Areas

- Remote sensing
- Image processing
- Space situational awareness

Dr. Hengky Chandrahalim

PhD, Electrical and Computer Engineering, Cornell University

Director of AFIT Nanofabrication and Characterization Facility

Assistant Professor of Electrical Engineering

Most Notable Publications

Jonathan W. Smith, Jeremiah C. Williams, Joseph S. Suelzer, Nicholas G. Usechak, and **Hengky Chandrahalim** (2020), "Three-dimensional Fabry–Pérot cavities sculpted on fiber tips using a multiphoton polymerization process," J. Micromech. Microeng., Vol 30, pp. 125007. (https://scholar.afit.edu/facpub/658/)

Michael D. Sherburne, Candice R. Roberts, John S. Brewer Jr., Thomas E. Weber, Tod V. Laurvick, and **Hengky Chandrahalim** (2020), "Comprehensive optical strain sensing through the use of colloidal quantum dots," ACS Appl. Mater. Interfaces, Vol 12, pp. 44156-44162. (https://scholar.afit.edu/facpub/646/)

Cong Chen, Jin Yuan, Lei Wan, **Hengky Chandrahalim**, Zhenshi Chen, Naoya Nishimura, Harunobu Takeda, Hiroaki Yoshioka, Weiping Liu, Yuji Oki, Xudong Fan, and Zhaohui Li (2019), "Demonstration of on-chip quantum dots microcavity lasers in a molecularly engineered annular groove," Optics Letters, Vol 44, pp. 495-498. (https://scholar.afit.edu/facpub/382/)

Lei Wan, **Hengky Chandrahalim**, Jian Zhou, Zhaohui Li, Cong Chen, Sangha Cho, Hui Zhang, Ting Mei, Huiping Tian, Yuji Oki, Naoya Nishimura, Xudong Fan, and Lingjie Jay Guo (2018), "Demonstration of versatile whispering-gallery micro-lasers for remote refractive index sensing," Optics Express, Vol 26, pp 5800-5809. (https://scholar.afit.edu/facpub/77/)

Lei Wan, **Hengky Chandrahalim**, Cong Chen, Qiushu Chen, Ting Mei, Yuji Oki, Naoya Nishimura, Lingjie Jay Guo, and Xudong Fan (2017), "On-chip, high-sensitivity temperature sensors based on dye-doped solid-state polymer microring lasers," Applied Physics Letters, Vol 111, pp 061109. (https://scholar.afit.edu/facpub/383/)

Selected Honors & Awards

- National Academy of Science's Fellowship Research Advisor (2020-2022)
- Strategic Ohio Council for Higher Education (SOCHE) Faculty Excellence Award (2020-2021)
- AFIT Graduate School of Engineering and Management Dean's Distinguished Teaching Professors Award (2020-2021)
- Semifinalist in the Air Force Spark Tank competition (as an advisor) (2020)
- IEEE NEMS Best Student Paper Finalist (as an advisor) (2019)

Significant Accomplishments

- Elected Senior Member, Optica (2021)
- US Patent 11,156,782, "Method of making temperature-immune self-referencing Fabry-Pérot cavity sensors" (2021)
- US Patent 10,942,313, "Temperature-immune self-referencing Fabry–Pérot cavity sensors" (2021)
- US Patent 8,390,398, "Digitally programmable RF MEMS filters with mechanically coupled resonators" (2013)
- Elected Senior Member, Institute of Electrical and Electronics Engineers (2011)

Research Interest Areas

- Symbiotically enhancing electronic, phononic, magnonic, and photonic microsystems
- MEMS-enabled reconfigurable quantum systems
- Optofluidics, photoacoustics, biophotonics, nonlinear optics, and optomechanics
- Mutually assisting micro- and nanosystems
- Fabrication techniques for novel integrated micro and nanosystems
- Molecular engineering
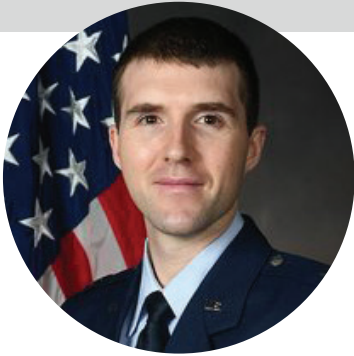
Maj Joseph A. Curro

PhD, Electrical Engineering, Air Force Institute of Technology

Assistant Professor of Electrical Engineering

Research Interest Areas

- Alternative Navigation
- Deep Learning
- Deep Reinforcement Learning

Lt Col James W. Dean

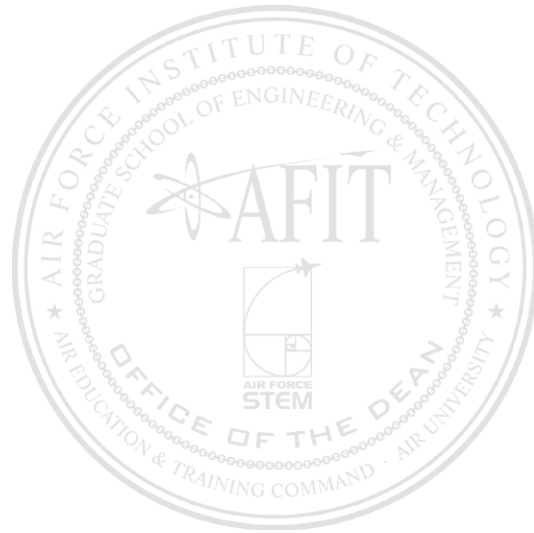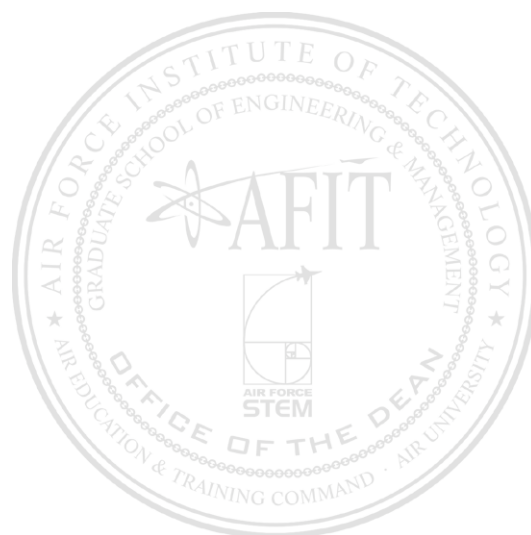**PhD, Computer Engineering, Air Force Institute of Technology**

Assistant Professor of Computer Engineering

Research Interest Areas

- Machine Learning (ML) and Artificial Intelligence (AI) algorithms, and their application to Department of Defense (DoD) problems.

- Artificial Neural Networks

- Embedded computing platforms

- Autonomous systems

- Cyber physical systems security

Maj Richard R. Dill

PhD, Computer Science, Air Force Institute of Technology

Assistant Professor of Computer Engineering

Most Notable Publications

DeBerry W.T., **Dill R.**, Hopkinson K., Hodson D.D., Grimaila M. The wargame commodity course of action automated analysis method. *The Journal of Defense Modeling and Simulation*. July 2021. DOI: 10.1177/15485129211028318

K. Basrawi and **R. Dill**, "Reverse Engineering the Soli Radar API for Military Applications," *2021 IEEE Radar Conference (RadarConf21)*, 2021, pp. 1-8, DOI: 10.1109/RadarConf2147009.2021.9455321

Long, S., **Dill, R.**, & Mullins, B. (2021). Security Analysis of the Masimo MightySat: Data Leakage to a Nosy Neighbor. *Proceedings of the 54th Hawaii International Conference on System Sciences*, 6893. https://doi.org/10.24251/hicss.2021.827

Tryhorn D, **Dill R.**, Hodson D.D., Grimaila M.R., Myers CW. Modeling fog of war effects in AFSIM. *The Journal of Defense Modeling and Simulation*. August 2021. https://doi:10.1177/15485129211041963

Hannah, J., Mills, R., **Dill, R.**, & Hodson, D. (2021). Traffic collision avoidance system: false injection viability. *Journal of Supercomputing*. https://doi.org/10.1007/s11227-021-03766-9

Significant Accomplishments

USAF CRADA: Air Force Institute of Technology and Bright Apps, LLC- Apr 2021

Research Interest Areas

- Cyber Security
- Artificial intelligence
- Algorithms
- Wargaming

Dr. Scott R. Graham

PhD, Electrical Engineering, University of Illinois at Urbana-Champaign

Director, Center for Cyberspace Research

Associate Professor of Computer Engineering

Most Notable Publications

Badenhop, C.W., **Graham, S.R.**, Mullins, B.E., Mailloux, L.O., "Looking Under the Hood of Z-Wave: Volatile Memory Introspection for the ZW0301 Transceiver", *ACM Transactions on Cyber-Physical Systems*, Vol 3 Issue 2, Dec 2018.

Nolan, B.C., **Graham, S.R.**, Mullins, B.E., Schubert-Kabban, C.M., "Automated Signal Extraction from Controller Area Networks", *IEEE Connected and Automated Vehicles Symposium*, Chicago, IL, USA, Aug 2018.

Badenhop, C.W., **Graham, S.R.**, Ramsey, B.W., Mullins, B.E., Mailloux, L.O., "The Z-Wave Routing Protocol and its Security Implications", *Elsevier Journal of Computers & Security*, Volume 68, Jul 2017, pp. 112-129.

Reber, P.E., **Graham, S.R.**, "Evaluating System on a Chip Design Security", *Journal of Information Warfare*, Vol 16, Issue 3, Summer 2017.

Gutierrez, J.A., Bindewald, J.M., **Graham, S.R.**, Rice, M.J., "Enabling Bluetooth Low Energy auditing through synchronized tracking of multiple connections", *International Journal of Critical Infrastructure Protection*, Sep 2017.

Selected Honors & Awards

* 2017 Air University Cat III Civilian of the Quarter

Research Interest Areas

* Embedded Systems Security
* Cyber Physical Systems
* Computer Communication Networks

Dr. Sanjeev Gunawardena

PhD, Electrical Engineering, Ohio University

Research Associate Professor of Electrical Engineering

Most Notable Publications

Pentecost, S., and **Gunawardena, S.** (2018, January). Dynamic Power Allocation with Constant Envelope Transmission for Next Generation Software-Defined GPS Payloads. *Proceedings of the 2018 International Technical Meeting of The Institute of Navigation* (pp. 869-877). Reston, Virginia.

Gunawardena, S., Raquet J., and Carroll, M. (2017, January). Innovation: Correlator Beamforming for Low-Cost Multipath Mitigation. GPS World. Retrieved from http://gpsworld.com/innovation-correlator-beamforming-for-low-cost-multipathmitigation/

Gunawardena, S., Raquet, J., and Carroll, M. (2017, January). Correlator Beamforming for Multipath Mitigation in High-Fidelity GNSS Monitoring Applications. Proceedings of the 2017 International Technical Meeting of The Institute of Navigation (pp. 1173-11880). Monterey, California.

J. M. Guerrero, and **Gunawardena, S.** (2017, January). Characterization of Timing and Pseudorange Biases Due to GNSS Front-End Filters by Type, Temperature, and Doppler Frequency. *Proceedings of the 2017 International Technical Meeting of The Institute of Navigation* (pp. 418-444). Monterey, California.

Wireman, M., **Gunawardena, S.**, and Carroll, M. (2017, January) High-Fidelity Signal Deformation Analysis of the Live Sky GLONASS Constellation using Chip Shape Processing, *Proceedings of the 2017 International Technical Meeting of The Institute of Navigation* (pp. 521-535). Monterey, California.

Research Interest Areas

Satellite Navigation and Timing (SatNav) Systems, Navigation Warfare, Advanced SatNav Signal Design and Payload Architectures, Positioning Navigation and Timing (PNT) Receiver Design, SatNav Signal Monitoring, Digital Signal Processing, Digital Systems Design, RF Systems Design, Embedded Systems Design, Reconfigurable Computing, Software Defined Radio, High Performance Computing, Domain-Specific Programmable ASICs and Architectures.

Selected Honors & Awards

- Civilian CAT III Award, 2016 1st Quarter, School of Engineering and Management, Air Force Institute of Technology, April 2016.

Significant Accomplishments

Dickman, J., Ahmadi, R., Cosgrove, M. A., and Gunawardena, S. (2015, January). System and Method for Detection of RF Signal Spoofing, US Patent No. 8934859. http://www.google.com/patents/US8934859

Gunawardena, S., Dickman, J., and Cosgrove, M. A. (2015, September). Reconfigurable Correlator for a Navigation System, US Patent No. 9124356. http://www.google.com/patents/US9124356

Gunawardena, S., Dickman, J., and Cosgrove, M. A. (2014, December). Systems and Methods for Adaptive Sample Quantization, US Patent No. 8923414. http://www.google.com/patents/US8923414
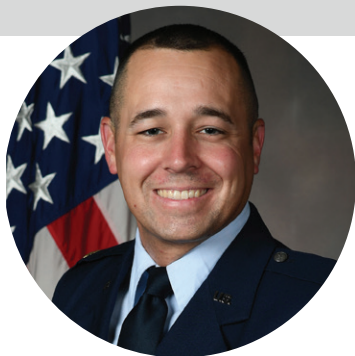
Gunawardena, S., Dickman, J., and Cosgrove, M. A. (2015, January). Packet-Based Input/Output Interface for a Correlation Engine, US Patent No. 8934384. http://www.google.com/patents/US8934384

Van Graas F., Soloviev, A., and Gunawardena, S. (2011, September). Systems and Methods for Acquisition and Tracking of Low CNR GPS Signals, US Patent No. 8013789, http://www.google.com/patents/US8013789

Maj Nicolas S. Hamilton

PhD, Electrical Engineering, Air Force Institute of Technology

Computer Science and Engineering Division Chief

Assistant Professor of Electrical Engineering

Most Notable Publications

Bettinger, R. A., Boone, N. R., **Hamilton, N. S.**, Little, B. D., "Spacecraft Charging Vulnerability near the Stable Earth-Moon Lagrange Points," *2021 IEEE Aerospace Conference*, Big Sky, MT, March 2021.

Nicolas Hamilton, Scott Graham, Timothy Carbino, James Petrosky, J. Addison Betances, "Adaptive-Hybrid Redundancy with Error Injection," *MDPI Journal of Electronics*, Vol. 8, No. 11, 1 Nov 2019.

Nicolas Hamilton, Scott Graham, Timothy Carbino, James Petrosky, J. Addison Betances, "Adaptive-Hybrid Redundancy for Rad-Hardening," *Proceedings of the IEEE 2019 National Aerospace and Electronics Conference (NAECON)*. IEEE, 15-19 Jul 2019.

Research Interest Areas

- Radiation hardening space electronics from single event upsets through hardware and software redundancy
- Field programmable gate arrays (FPGAs)
- Very large scale integrated (VLSI) circuits

Dr. Michael J. Havrilla

PhD, Electrical Engineering, Michigan State University

Professor of Electrical Engineering

Most Notable Publications

Karuppuswami, S., E. Rothwell, P. Chahal and **M. Havrilla** (2018), "A triaxial applicator for the measurement of the electromagnetic properties of materials," *Sensors*, Vol 18, No. 1, pp. 1-15.

Bogle, A., M. Hyde, **M. Havrilla** and J. Sovern (2017), "High-temperature RF material characterization using a dual-chambered rectangular waveguide fixture," *IEEE Transactions on Instrumentation and Measurement*, Vol 66, No 9, pp. 2422-2427.

Uber, R., A. Wood and **M. Havrilla** (2017), "Analysis and Numerical Solution of Transient Electromagnetic Scattering from Two Cavities," *Journal of Computational Physics*, Vol 343, pp. 217-234.

Hyde, M. and **M. Havrilla** (2016), "A broadband, nondestructive microwave sensor for characterizing magnetic sheet materials," *IEEE Sensors Journal*, Vol 16, No 12, pp. 4740-4748.

Hyde, M., **M. Havrilla** and A. Bogle (2016), "Nondestructive determination of the permittivity tensor of a uniaxial material using a two-port clamped coaxial probe," *IEEE Transactions on Microwave Theory and Techniques*, Vol 64, No 1, pp. 239-246.

Selected Honors & Awards

- Vice President, Antenna Measurement Techniques Association (2018)

- Best student paper award, 1st place, A. Knisely, Antenna Measurement Techniques Association Conference, advised by M. Havrilla (2017)

- Elected Senior Member, Antenna Measurement Techniques Association (2016)

Research Interest Areas

- Electromagnetics
- Metamaterials
- Stealth technology
- Antennas
- Nanophotonics

Lt Col Wayne C. Henry

PhD, Electrical Engineering, Air Force Institute of Technology

Assistant Professor of Computer Engineering

Most Notable Publications

A. Park, R. Dill, D. Hodson, **W. Henry**, "DDS-Cerberus: Data Distribution via Ticketing", The 2021 World Congress in Computer Science, *Computer Engineering, & Applied Computing (CSCE'21)*, Las Vegas, NV, Jul 26-29, 2021.

Henry, W.C. and Peterson, G.L., "SensorRE: Provenance Support for Software Reverse Engineers," in *Computers & Security.* IEEE, Vol. 95, pp. 1-13, 2020.

Henry, W.C. and Peterson, G.L., "Exploring Provenance Needs in Software Reverse Engineering." *2020 13th International Conference on Systematic Approaches to Digital Forensic Engineering (SADFE)*. IEEE, 2020.

Henry, W.C. and Mullins, B.E., "VANISH: A Variable Advanced Network IRC Stealth Handling System," *International Journal of Security and Networks*, Vol. 9, No. 2, pp. 114-123, 2014.

Henry, W.C., Stange, J.M., and Trias, E.D., "Pearl Harbor 2.0: When Cyber-Acts Lead to the Battlefield," *Journal of Information Warfare*, Vol. 9, No. 2, pp. 47-56, 2010.

Selected Honors & Awards

- Tau Beta Pi, Engineering Honor Society, 2019

- Eta Kappa Nu, Eletrical Engineering Honor Society, 2019

- AFRL International Project Team Award, 2009

Significant Accomplishments

- NSA Codebreaker Cybersecurity Challenge, Coach/Team Winner, 2021

Research Interest Areas

- Software Reverse Engineering
- Cyber Security
- Human-Computer Interaction
- Covert Channels / Steganography

Dr. Douglas D. Hodson

PhD, Computer Engineering, Air Force Institute of Technology

Associate Professor of Computer Engineering

Most Notable Publications

D.B. Worth, B.G. Woolley and **D.D. Hodson**, "SwarmSim: A Framework for Modeling Swarming UAVs using Hardware-in-the-Loop," *Journal of Defense Modeling and Simulation (JDMS)*, Jul 2017.

A.J. Roberts, L.O. Mailloux and **D.D. Hodson**, "A Case Study in Understanding and Evaluating Live Virtual Constructive Command and Control Training Effectiveness," *ITEA Journal of Test and Evaluation*, Vol 38, pp. 265-273, Jun 2017.

L.O. Mailloux, M.R. Grimaila, **D.D. Hodson** and G.B. Baumgartner, "The Benefits of Joining an Effective Research Team," *IEEE Potentials*, Vol 35, No. 3, May/June 2017.

J.R. Millar, **D.D. Hodson**, G.L. Peterson and D.K. Ahner, "Optimizing Update Scheduling Parameters for Distributed Virtual Environments," *Concurrency and Computation: Practice and Experience (CCPE), Special Issue on Trends and Advances in Collaboration Technologies and Systems*, Mar 2017.

L.O. Mailloux, M.R. Grimaila, **D.D. Hodson**, R.D. Engle*, C. McLaughlin and G.B. Baumgartner, "Modeling, Simulation, and Performance Analysis of Decoy State Enabled Quantum Key Distribution Systems," *Applied Sciences*, Jan 2017.
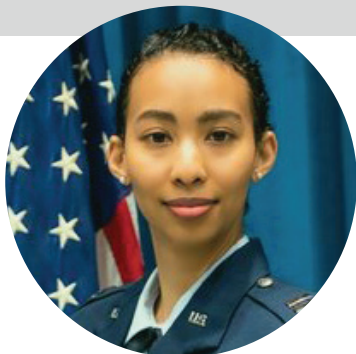
Selected Honors & Awards

- Southwestern Ohio Council for Higher Education (SOCHE) Faculty Excellence Award (2017)

Research Interest Areas

- Software Engineering
- Modeling and Simulation
- Real-Time Interactive Distributed Simulations
- Software Engineering Analytics

Capt Leleia A. Hsia

PhD, Electrical Engineering, Air Force Institute of Technology

Assistant Professor of Electrical Engineering

Most Notable Publications

L. A. Hsia, L. D. Merkle, D. E. Weeks, G. Vernizzi, M. Y. Lanzerotti, D. Langley, "Physically Unclonable Characteristics for Verification of Transmon-Based Quantum Computers," *Proceedings of 2020 Government Microcircuit Applications and Critical Technology Conference*, San Diego, CA, March 2020.

L. A. Hsia, L. D. Merkle, G. Vernizzi, M. Y. Lanzerotti, D. Langley, "On Classical Hardware Verification and Security Techniques for Quantum Computing Systems," *Proceedings of 2019 Government Microcircuit Applications and Critical Technology Conference*, Albuquerque, NM, March 2019, 6 pages.

L. A. Hsia, G. Vernizzi, M. Y. Lanzerotti, D. Langley, "Sampling Iso-Functional Signal Switches in Library Circuits for Microelectronics Verification with Topological Constraints," *National Aerospace & Electronics Conference (NAECON)*, Dayton, OH, June 2017, 4 pages.

L. A. Hsia, G. Vernizzi, M. Y. Lanzerotti, D. Langley, "Building a Library for Microelectronics Verification with Topological Constraints," *Proceedings of 2017 Government Microcircuit Applications and Critical Technology Conference*, Reno, NV, March 2017, 4 pages.

L. A. Hsia, G. Vernizzi, M. Y. Lanzerotti, D. Langley, M. K. Seery, L. Orlando, "Topological Constraints of Gate-Level Circuits Obtained Through Standard Cell Recognition (SCR)," *National Aerospace & Electronics Conference (NAECON)*, Dayton, OH, June 2015, 11 pages.

Selected Honors & Awards

- Company Grade Officer of the Quarter Award, 2020 1st Quarter, Air Force Institute of Technology, April 2020

Research Interest Areas

- Quantum Hardware Verification
- Quantum Hardware Security
- Quantum Computing
- Classical Hardware Verification
- Classical Hardware Security
- VLSI

Dr. Julie A. Jackson

PhD, Electrical Engineering, The Ohio State University

Professor of Electrical Engineering

Most Notable Publications

J. A. Jackson and F. Lee-Elkin, "Exploiting Channel Crosstalk for Polarimetric SAR Compressive Sensing," to appear *IEEE Transactions on Aerospace and Electronic Systems*, available online Early Access May 2019: https://ieeexplore.ieee.org/stamp/stamp.jsp?tp=&arnumber=8718553

A. Evers and **J. A. Jackson**, "A Generalized Phase Gradient Autofocus Algorithm," *IEEE Transactions on Computational Imaging*, available online Early Access Feb 2019: https://ieeexplore.ieee.org/document/8642429

A. Evers and **J. A. Jackson**, "Cross-Ambiguity Characterization of Communication Waveform Features for Passive Radar," *IEEE Transactions on Aerospace and Electronic Systems*, vol. 51, no. 4, pp. 3440-3455, Oct 2015.

S. R. Stevens and **J. A. Jackson**, "Emitter Selection Criteria for Passive Multistatic Synthetic Aperture Radar Imaging," *IET Radar Sonar and Navigation, special topics section on Waveform Diversity and Spectrum Engineering*, vol. 8, no. 9, pp. 1267-1279, Dec. 2014.

J. A. Jackson, B. D. Rigling, and R. L. Moses, "Canonical Scattering Feature Models for 3D and Bistatic SAR," *IEEE Transactions on Aerospace and Electronic Systems*, vol. 46, no. 2, pp. 525-541, April 2010.

Research Interest Areas

- Radar signal and image processing
- Radar cross section scattering prediction
- Phenomenology

Selected Honors & Awards

- IEEE Aerospace and Electronic Systems Society Fred Nathanson Memorial Radar Award Winner (2019)
- Air University and AFIT Winner Civilian Category 3 Quarterly Award (2018)
- Southwestern Ohio Council for Higher Education (SOCHE) 2016 Faculty Excellence Award (2016)
- Air Force level Winner: 2012 Air Force Science, Technology, Engineering, and Mathematics (STEM) Awards, Outstanding Engineer Award, Junior Civilian Category

Significant Accomplishments

- Serves on the IEEE AESS Radar Systems Panel

Lt Col David W. King

PhD, Computer Science, Air Force Institute of Technology

Assistant Professor of Computer Science

Most Notable Publications

David King, Gilbert Peterson, "Decentralized Control Strategies for Unmanned Aircraft System Pursuit and Evasion," *Proceedings of the IEEE 2019 90th Vehicular Technology Conference (VTC2019-Fall)*, 22-25 Sep 2019.

David King, Lukas Esterle, Gilbert Peterson, "Entropy-Based Team Self-Organization with Signal Suppression," *Proceedings of the 2019 conference on Artificial Life (ALIFE2019)*, 29 Jul-2 Aug 2019.

David King, Gilbert Peterson, "The Emergence of Division of Labor in Multi-Agent Systems," *Proceedings of the IEEE 2019 13th International Conference on Self-Adaptive and Self-Organizing Systems (SASO2019)*, 16-20 June 2019.

David King, Gilbert Peterson, "A Macro-Level Order Metric for Self-Organizing Adaptive Systems," *Proceedings of the IEEE 12th International Conference on Self-Adaptive and Self-Organizing Systems (SASO2018)*, 2-6 Aug 2018.

David King, Gilbert Peterson, "Epaminondas: Exploring Combat Tactics," *International Computer Games Association Journal*, vol. 37, no. 3, 131-143, Jan 2014.

Selected Honors & Awards

- Outstanding Contributor, Squadron Officer School, 2015

- Distinguished Graduate, AFIT, 2014

- USAFE Ground Tactical Communications CGO of the Year, 2009

- 52 FW Communications and Information CGO of the Year, 2009

- Distinguished Graduate, Expeditionary Communications and Information Officer Training, 2005

- Distinguished Graduate, ROTC, University of Maryland, College Park, 2005

- John Levitow Award, Airman Leadership School, 1999

Significant Accomplishments

- Reviewer, IEEE Conference on Autonomic Computing and Self-Organizing Systems (ACSOS)

Research Interest Areas

- Emergence
- Self-organizing systems
- Artificial intelligence
- Multi-agent systems

- Agent learning
- Machine learning
- Games

Dr. Gary B. Lamont

PhD, Electrical Engineering, University of Minnesota Institute of Technology

Professor of Electrical and Computer Engineering

Most Notable Publications

Books (6), Book Chapters (8)

Carlos A. Coello Coello, **Gary B. Lamont**, David A. Van Veldhuizen, "Evolutionary Algorithms for Solving Multi-Objective Problems", *Springer,* 2007, 2nd Revised Edition.

Papers – (over 200; 1970-2017)
Jason M. Blackford and **Gary B. Lamont**, "A Novel Approach to The Real-Time Strategy Build Order Problem with Skill Level as a Metric", *IEEE Transactions on Computational Intelligence and Games*, 2016.

Nicholas S. Kovach*, Alan S. Gibson*, **Gary B. Lamont**, "Hypergame Theory: A Model for Conflict, Misperception, and Deception", *International Journal of Computer Games Technology*, Volume 2015, Article ID 570639, 20 pages, Hindawi Publishing.

Selected Honors & Awards

- IEEE Fritz Russ Bio-Engineering Award (2008)

- IEEE Senior Life Member (2004)

- Eta Kappa Nu AFIT Teacher of the Year (2002)

Research Interest Areas

- Evolutionary computation
- Artificial immune systems
- Bio-inspired computing
- Information security
- Intrusion and anomaly detection
- Parallel and distributed computation
- Combinatorial optimization problems (single objective and multi-objective)

- Image processing
- Protein structure prediction
- Software engineering
- Digital signal processing
- Intelligent and distributed control systems
- Autonomous multi-agent systems (unmanned ad-hoc aerial vehicles, robots, etc.)

Dr. Robert C. Leishman

PhD, Mechanical Engineering, Brigham Young University

Research Assistant Professor of Autonomy

Most Notable Publications

Leishman, R. C., Gray, J., & Raquet, J. (2017). Utilization of UAV autopilots in vision-based alternative navigation. In *30th International Technical Meeting of the Satellite Division of the Institute of Navigation*, ION GNSS 2017 (Vol. 4). Portland, OR.

Leishman, R. C., & McLain, T. W. (2015). A Multiplicative Extended Kalman Filter for Relative Rotorcraft Navigation. *Journal of Aerospace Information Systems*.

Leishman, R. C., Mclain, T. W., & Beard, R. W. (2014). Relative Navigation Approach for Vision-Based Aerial GPS-denied Navigation. *Journal of Intelligent and Robotic Systems*, 47(1), 97-111.

Leishman, R. C., MacDonald, J. C., Beard, R. W., & McLain, T. W. (2014). Quadrotors & Accelerometers: State Estimation with an Improved Dynamic Model. *Control Systems Magazine*, 34(1), 28-41.

Leishman, R. C., Koch, D. P., McLain, T. W., & Beard, R. W. (2013). Robust visual motion estimation using RGB-D cameras. In *AIAA Infotech @ Aerospace Conference*. Boston, MA, USA.

Selected Honors & Awards

- The Presidents Volunteer Service Award - Silver Category (2017)

Research Interest Areas

- Autonomous aerial vehicles
- Autonomy
- Non-GPS navigation
- Image processing
- Sensor fusion and control

Dr. Richard K. Martin

PhD, Electrical Engineering, Cornell University

Professor of Electrical Engineering

Most Notable Publications

Christian K. Keyser, **Richard K. Martin**, P. Khanh Nguyen, and Arielle M. Adams, "Single-Pulse Mueller Matrix LiDAR Polarimeter: Modeling and Demonstration," *IEEE Transactions on Geoscience and Remote Sensing*, vol. 57, no. 6, pp. 3296-3307, June 2019. Nominated for TGRS Best Paper award, CY2019 (pending).

Joshua Dickey‡, Brett Borghetti, William Junek, and **Richard K. Martin**, "Beyond Correlation: A Path-Invariant Measure for Seismogram Similarity," *Seismological Research Letters*, vol. 91, no. 1, pp. 356-369, Jan 2020.

Christopher Vergara, **Richard K. Martin**, Peter J. Collins, and James R. Lievsay, "Multi-Sensor Data Fusion between Radio Tomographic Imaging and Noise Radar," *IET Radar, Sonar & Navigation*, vol. 14, no. 2, pp. 187-193, Feb 2020.

Christian K. Keyser, **Richard K. Martin**, Helena Lopez-Aviles, Khanh Nguyen, Arielle M. Adams, and Demetrios Christodoulides, "Single-Pulse, Kerr-Effect Mueller Matrix LiDAR Polarimeter," *Optics Express*, vol. 28, no. 9, pp. 13694-13713, 27 April 2020.

Pranav Patel and **Richard K. Martin**, "End-to-End Direct Digital Synthesis Simulation and Mathematical Model to Minimize Quantization Effects of Digital Signal Generation," to appear in *IEEE Open Journal of the Communications Society*, accepted on 28 Sep 2020, 10 pages.

Significant Accomplishments

- Holds seven patents

Research Interest Areas

- Through-wall radio imaging
- Laser radar target identification
- Engineering education methodology

Dr. Laurence D. Merkle

PhD, Computer Engineering, Air Force Institute of Technology

Assistant Professor of Computer Engineering

Most Notable Publications

C. Johnson, M. McGill, D. Bouchard, M. K. Bradshaw, V. A. Bucheli, **L. D. Merkle**, M. J. Scott, Z. Sweedyk, J. Ángel, Z. Xiao, and M. Zhang. "Game Development for Computer Science Education." In *Proceedings of the 2016 ITiCSE Working Group Reports (ITiCSE '16)*. ACM, New York, NY, USA, 23-44, 2016.

A. Chidanandan and **L. D. Merkle**. "Use of Version Control Software in a Project-Based Introductory Computer Architecture Course." *Computers in Education Journal*, Vol. XVIIII [sic], 2009, No. 3, pp 38-50.

L. D. Merkle and J. W. Luginsland. "Design Optimization for a Novel Class of High Power Microwave Sources." *Proceedings of the 2003 IEEE Congress on Evolutionary Computation*, presented in the special session on Evolutionary Design Optimization.

G. B. Lamont and **L. D. Merkle**. "Towards Effective Evolutionary Algorithms for Polypeptide Structure Prediction." In G. Fogel and D. W. Corne, editors, *Evolutionary Computation in Bioinformatics*, 2003.

B. S. Fagin and **L. D. Merkle**. "Quantitative Analysis of the Effects of Robots on Computer Science Education." *ACM Journal of Educational Resources in Computing*, Vol. 2, No. 4, December 2002, pp. 1-18.

Selected Honors & Awards

- Best Poster, 22nd Colloquium for Information Security Systems Education

- Best Paper, Mechanical Engineering Division, 2005 American Society for Engineering Education Annual Conference & Exposition

- Best Presentation, Space Situational Awareness Session, 20th Annual Advanced Maui Optical and Space Surveillance Technologies Conference, 2019

- USAFA Department of Computer Science Research Excellence Award, 2001-02

Research Interest Areas

- Algorithms
- Computability and complexity
- Computational science and engineering
- Cybersecurity education
- Evolutionary computation
- Games in computing education
- Optimization
- Quantum computing
- Space situational awareness

Dr. Robert F. Mills

PhD, Electrical Engineering, University of Kansas

Professor of Electrical Engineering

Most Notable Publications

Span, M., Mailloux, L.O., **Mills, R.F.**, and Young, W., "Conceptual Systems Security Requirements Analysis: Aerial Refueling Case Study", accepted for publication in *IEEE Access*, 30 Jul 2018.

Rich, M.D., **Mills, R.F.**, Dube, T.E., and Rogers, S.K., "Evaluating Machine Learning Classifiers for Defensive Cyber Operations", *Military Cyber Affairs*, Vol 2, Issue 1, Article 6, pp 1-19, 2016.

Vaughan, S.L., **Mills, R.F.**, Peterson, G.L., Grimaila, M.R., Rogers, S.K., Oxley, M.E., and Patterson, R.E., "A dual-process Qualia Modeling Framework", *Biologically Inspired Cognitive Architectures (BICA) Journal,* 2016, pp 71-85.

Selected Honors & Awards

- Air Force Association Bernard A. Schriever Award for advancing aerospace power, technology, doctrine, or the Air Force as a profession (2015).

- U.S. Government Information Security Leadership Awards, Workforce Improvement Category, Team Award: Cyberspace 200/300 Professional Continuing Education Team, Air Force Cyberspace Technical Center of Excellence, International Information Systems Security Certification Consortium, Inc., (ISC)²® (2011 and 2014).

Research Interest Areas

- Electronic warfare
- Avionics security
- RF fingerprinting
- Network operations and security
- Situation awareness

Dr. Barry E. Mullins

PhD, Electrical Engineering, Virginia Tech

Professor of Computer Engineering

Most Notable Publications

L. Bradford, **B E. Mullins**, S. Dunlap, and T. Lacey, "Variable Speed Simulation for Accelerated Industrial Control System Cyber Training," *Critical Infrastructure Protection XII*, J. Staggs and S. Shenoi, eds., Springer, New York, NY, https://doi.org/10.1007/978-3-030-04537-1_15, December 2018, pp. 283-306.

K. A. Girtz, **B. E. Mullins**, M. Rice, and J. Lopez Jr., "Practical Application Layer Emulation In Industrial Control System Honeypots," *Critical Infrastructure Protection X*, M. Rice and S. Shenoi, eds., Springer, New York, NY, November 2016, pp. 83-98.

S. M. Beyer, **B. E. Mullins**, S. R. Graham, and J. M. Bindewald, "Pattern-of-Life Modeling in Smart Homes," *IEEE Internet of Things Journal*, vol. 5, no. 6, December 2018, DOI: 10.1109/JIOT.2018.2840451, pp. 5317-5325.

B. W. Ramsey, **B. E. Mullins**, M. A. Temple, and M. R. Grimaila, "Wireless Intrusion Detection and Device Fingerprinting through Preamble Manipulation," *IEEE Transactions on Dependable and Secure Computing*, vol. 12, no. 5, September/October 2015, pp. 585-596.

C. W. Badenhop and **B. E. Mullins**, "A Black Hole Attack Model Using Topology Approximation for Reactive Ad-hoc Routing Protocols," *International Journal of Security and Networks (IJSN)*, Inderscience Publishers, vol. 9, no. 2, 2014, pp. 63-77.

Selected Honors & Awards

- Research Advisor for Chancellor's Award Recipient (Best AFIT thesis), S. Beyer, 2018

- Cage H. Crocker Outstanding AFIT Professor Award for CY2011, awarded by AFIT Board of Visitor.

- IEEE and Eta Kappa Nu – C. Holmes MacDonald Outstanding Electrical and Computer Engineering Teacher Award, 2011

- Air Force Science & Engineering Educator of the Year, 2010

- Professor Ezra Kotcher Award for CY2008, awarded by AFIT Board of Visitor, 2009

- Dr. Leslie M. Norton Teaching Excellence Award for CY2008, awarded by AFIT Student Association, 2009

- Outstanding Teaching Award, Eta Kappa Nu, Delta Xi Chapter, Electrical Engineering / Computer Engineering, 2009

- AFIT Thesis Advisor Award, Tau Beta Pi, Ohio Eta Chapter, for K. R. Schrader thesis, 2009

- Outstanding Academy Educator, Department of Electrical Engineering, U.S. Air Force Academy, Colorado, 2002

Research Interest Areas

- Cyber-physical systems security/sensing
- Internet of Things security
- Cyber operations
- Critical infrastructure protection
- Computer/network/embedded systems security
- Reverse code engineering

Dr. Scott L. Nykl

PhD, Computer Science, Ohio University

Associate Professor of Computer Science

Most Notable Publications

N. Seydel A, W. DallmannA, and **S. Nykl**, "Visualizing behaviors when using real vs synthetic imagery for computer vision," in *Proceedings of the 2018 International Conference on Scientific Computing*, Las Vegas, NV, 2018.

K. Bentjen O, S. GrahamF, and **S. Nykl**, "Modelling Misbehaviour in Automated Vehicle Intersections in a Synthetic Environment," in *13th International Conference on Cyber Warfare and Security* (ICCWS). ICCWS, March 2018.

K. Bentjen O, S. Graham F, and **S. Nykl**, "Introducing Persistent Human Control into a Reservation-Based Autonomous Intersection Protocol," in *International Conference of Critical Infrastructure Protection*. IFIP, March 2018.

N. Becherer, J. Pecarina, **S. Nykl** and K. Hopkinson, "Improving optimization of convolutional neural networks through parameter fine-tuning," *Neural Computing and Applications*, Nov 2017.

D. T. Johnson, **S. Nykl**, and J. Raquet, "Combining Stereo Vision and Inertial Navigation for Automated Aerial Refueling," *Journal of Guidance, Control, and Dynamics*, vol. 40, no. 9, pp. 2250–2259, May 2017.

Selected Honors & Awards

- AETC MAJCOM Winner - Air Force Outstanding Scientist/Engineer, Junior (2017)

- AFIT/ ENG's 3rd Quarter Nominee (2017)

- Gage H. Crocker Outstanding Professor Award Nominee (2016)

Research Interest Areas

Computer Graphics, Interactive 3D Graphics, Synthetic Vision (SVS), Augmented Reality (AR), Computational Geometry, GPGPU (General Purpose Graphics Processing Unit) Programming, OpenGL, Level of Detail, Image-Based Rendering, Distributed Real Time Visualizations, Algorithms, Big Data, Parallel Computation, Networking, TCP/IP, Distributed Computing, Embedded Systems, Parallel/ Concurrent Programming, Multi-Core/Multi-Threading, Sensor Fusion, Neural Networks, Machine Learning, Linear Algebra, Numerical Analysis, and Data Structures

Dr. Meir N. Pachter

PhD, Applied Mathematics, Israel Institute of Technology

Professor of Electrical Engineering

Most Notable Publications

M. Pachter, E. Garcia and D. Casbeer (2018) "Toward a Solution of the Active Target Defense Differential Game", *Dynamic Games And Applications*, Appeared electronically on March 19.

M. Pachter (2018) "On Linear-Quadratic Gaussian Dynamic Games", in *Advances in Dynamic Games and Mean Field Games*, Birkhauser/Springer, pp. 301-322.

M. Pachter, E. Garcia and D. Casbeer (2017) "The Differential Game of Guarding a Target", *AIAA Journal of Guidance, Control and Dynamics*, Vol 40, No. 11, November 2017, pp. 2986 - 2993.

M. Pachter and T. J. Montgomery (2017) "Visual-INS Using a Human Operator and Converted Measurements", *IEEE Trans. on Aerospace and Electronic Systems*, Vol. 53, Issue 5, pp. 2359-2371.

A. Mirabile and **M. Pachter** (2017) "Pilot-Assisted INS Aiding Using Bearings-Only Measurements Taken Over Time", *NAVIGATION*, Vol. 64, Issue 2, pp. 183-196.

Selected Honors & Awards

- Distinguished Researcher Award, granted by the Affiliated Professional Societies, Dayton, OH (1999).

Research Interest Areas

- Guidance, Control and Navigation
- Game Theory
- Optimal Control
- System Identification
- Mathematical Modeling

Dr. Gilbert L. Peterson

PhD, Computer Science, University of Texas at Arlington

Professor of Computer Science

Most Notable Publications

Jordan, P.L., **Peterson, G.L.**, Lin, A.C., Mendenhall, M.J., and Sellers, A.J., "Narrowing the scope of failure prediction using targeted fault load injection", *Enterprise Information Systems*, October 2017, pp. 1-16 (DOI: https://doi.org/10.1080/17517575.2017.1390167).

Lapso, J., **Peterson, G.L.**, and *Okolica, J.S., "Whitelisting system state in windows forensic memory visualizations", *Digital Investigation*, Vol. 20, March 2017, pp. 2-15.

Bindewald, J.M., **Peterson, G.L.**, Miller, M.E., "Clustering-Based Online Player Modeling," In: Cazenave T., Winands M., Edelkamp S., Schiffel S., Thielscher M., Togelius J. (eds) Computer Games. *Communications in Computer and Information Science*, vol 705. Springer, 2017.

Schmitt, D.T. and **Peterson, G.L.**, "Feature Detection and Matching on Atmospheric Nuclear Detonation Video," *IET Computer Vision Journal*, vol. 10, no. 5, pp. 359-365, 2016.

King, D.W., and **Peterson, G.L.**, "Epaminondas: Exploring Combat Tactics", *International Computer Games Association Journal*, vol. 37, no. 3, 2015, pp. 131-143.

Selected Honors & Awards

• Chair of the IFIP Working Group 11.9 Digital Forensics (Present)

• International Federation of Information Processing Silver Core Award (2017)

Significant Accomplishments

• 1st Place Grand Champion-Annual DoD Cyber Crime Center (DC3) Digital Forensics Challenge (2009)

• Air Force Outstanding Scientist Award, Junior Civilian (2008)

• Recipient of UTA/CSE Outstanding PhD Research Award (2001)

Research Interest Areas

• Artificial Intelligence Statistical Machine Learning
• Autonomous Robots
• Digital Forensics

Dr. Mark G. Reith

PhD, Computer Science, University of Texas at San Antonio

Assistant Professor of Computer Science

Most Notable Publications

Noel, G. and **Reith, M.** "Cyber-Warfare Evolution and Role in Modern Conflict", *Journal of Information Warfare*, 20(4), 30-44. Fall 2021.

Flack, N., Lin, A., Peterson, G., and **Reith, M.** "Battlespace NextTM: Developing a Serious Game to Explore Multi-Domain Operations", *International Journal of Serious Games*, 7(2), 49-70. 1 June 2020.

Tomcho, L. and **Reith, M.** "Engaging Airmen with Cyber Education and Training: Designing a Platform Using Gamification", *Journal of The Colloquium on Information Systems Security Education*, 6(2), 1-23. 28 February 2019.

Niu, J., **Reith, M.** and Winsborough, W.H. "Formal Verification of Security Properties in Trust Management Policy", *Journal of Computer Security*, 22(1), 69-153, 2014.

Reith, M., Carr, C. and Gunsch G. "An Examination of Digital Forensic Models", *International Journal of Digital Evidence*, 1(3), 1-12. Fall 2002.

Selected Honors & Awards

- AFIT Team of the Quarter (2021)
- Bernard A. Schriever Essay Contest Runner-Up (2018)
- Army Commendation Medal (2018)
- AFIT Team of the Quarter (2017)
- Bernard A. Schriever Essay Contest Winner (2017)

Served in command positions contributing toward:
- 67th Cyberspace Wing rated "Highly Effective" (AFSPC/IG, 2016)
- 690th Network Support Squadron rated "Highly Effective" (67 CW/IG, 2015)
- 67th Cyberspace Wing awarded 2013 Omaha Trophy (USSTRATCOM)
- 67th Cyberspace Wing awarded 2012 General Moorman Award (AFSPC)

- Joint Service Accommodation Medal (2011)
- Afghanistan Campaign Medal (2011)
- AFIT Field Grade Officer of the Quarter (2010)
- Outstanding Contributor Award (peer selection, Squadron Officer School, 2005)

Significant Accomplishments

- Featured in Wright-Patterson AFB's *Skywrighter* article "Research Project Evolves into Cyber Education Hub" by Stacy Geiger (2 August 2019)

- Featured in *Airman Magazine* article "Byte-size Learning" by Joseph Eddins (8 May 2018)

Research Interest Areas

- Digital Learning Technologies
- Digital Engineering
- Cyber Education
- Cyber Situational Awareness & Mission Assurance
- Joint All Domain / Multi-Domain Operations
- Cyber Warfare Theory

Lt Col John C. Rice

PhD, Computer Science, Air Force Institute of Technology

Associate Dean of Students

Assistant Professor of Computer Science

Most Notable Publications

Rice, J., Mills, R., Temple, M., Peterson, J. "Increased Ambiguity Resolution in Digital Radio Frequency Receivers," *2015 IEEE International Conference on Microwaves, Communications, Antennas, and Electronic Systems*, Tel Aviv, Israel.

Research Interest Areas

- Artificial Intelligence
- Autonomy
- Electronic Warfare
- Cognitive Electronic Warfare
- Sensing
- Dual Process Theory

Lt Col James M. Sattler

PhD, Electrical Engineering, Air Force Institute of Technology

Assistant Professor of Electrical Engineering

Most Notable Publications

J.M. Sattler, R.A. Coutu, Jr., R. Lake, T. Laurvick, T. Back, S. Fairchild, "Modeling micro-porous surfaces for secondary electron emission control to suppress multipactor," *J. Appl. Phys.*, vol. 122, no. 055304, 2017.

T.V. Laurvick, R.A. Coutu, Jr., **J.M. Sattler**, R.A. Lake, "Surface feature engineering through nanosphere lithography," *J. Micro/Nanolithography, MEMS, and MOEMS*, vol. 15, no. 3, p. 031602, 2016.

J.W. McClory, J.C. Petrosky, **J.M. Sattler**, T.A. Jarzen, "An analysis of the effects of low-energy electron irradiation of AlGaN/GaN HFETs," *IEEE Trans. Nucl. Sci.*, vol. 54, no. 6, pp. 1946-1952, 2007.
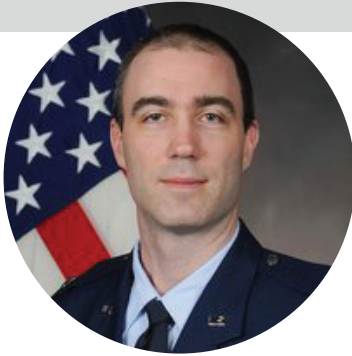
Selected Honors & Awards

- IEEE Dayton Section Ravi Pallerla Young Professionals Award 2018

- AFIT Student Field Grade Officer of the Year 2016

- Rensselaer Polytechnic Institute Erik Jonsson Prize 2002

Research Interest Areas

- Semiconductor Devices
- Radiation Effects on Semiconductor Devices
- Secondary Electron Emission

Lt Col Michael D. Seal

PhD, Electrical Engineering (Low Observables), Air Force Institute of Technology

Assistant Professor of Electrical Engineering

Most Notable Publications

M. D. Seal, M. W. Hyde IV, and M. J. Havrilla, "Nondestructive complex permittivity and permeability extraction using a two-layer dual-waveguide probe measurement geometry," *Progress In Electromagnetics Research*, Vol. 123, 123-142, 2012.

Seal, M. D., and M. A. Marciniak. "Partially coherent bidirectional reflectance distribution data computation for modeling periodic plasmonic structures at infrared wavelengths." *Infrared Physics & Technology* 62 (2014): 39-44.

M.D. Seal, N.R. Murphy, J.P. Lombardi, M.A. Marciniak, "Selective thermal emission from a patterned metalized plastic", *Infrared Physics & Technology*, Volume 67, November 2014, Pages 250-255.

Benson, M.R.; Knisely, A.G.; Marciniak, M.A.; **Seal, M.D.**; Urbas, A.M., "Permittivity and Permeability Tensor Extraction Technique for Arbitrary Anisotropic Materials," in *Photonics Journal*, IEEE , vol.7, no.3, pp.1-13, June 2015.

Catarius, A. M.; **Seal M. D.**, "Static scene statistical algorithm for nonuniformity correction in focal-plane arrays," *Opt. Eng.* 0001;54(10):104111, Oct 2015.

Research Interest Areas

- Lt Col Seal's research interests lie primarily in the area of applied computational electromagnetics, specifically in the application and expansion of the family of semi-analytic solution to modern problems. Other areas of active research and collaboration include antenna design and simulation for complex platform installations and electro-optics. He also has signficant experiencing applying DoD High Performance Computing resources and the specific sub-discipline of operations research required to cast measured or physics based modeling results into operationally relevant metrics for direct and higher level analysis.

Dr. Clark N. Taylor

PhD, Electrical Engineering, University of California, San Diego

Assistant Professor of Computer Engineering

Most Notable Publications

D.B. Barber, J.D. Redding, T.W. McLain, R.W. Beard, and **C.N. Taylor**, "Vision-based Target Geo-location Using a Fixed-Wing Miniature Air Vehicle," *Journal of Intelligent and Robotic Systems*, Vol. 47, No. 4, pp. 361-382, Dec 2006.

C.N. Taylor and A.N. Bishop, "Homogeneous Functionals and Bayesian Data Fusion with Unknown Correlation," *Information Fusion*, v. 45, Jan 2019.

R. Sharma, R.W. Beard, **C.N. Taylor**, and S. Quebe, "Graph-based Observability Analysis of Bearing-only Cooperative Localization," *IEEE Transactions on Robotics*, Vol. 28, No. 2, pp. 522-529, Apr 2012.

Selected Honors & Awards

*   AFRL Sensors Directorate, Innovation Award, 2015

*   AFRL Sensors Directorate, Mid-Career Civilian Engineer/Scientist Award, 2014

*   AFOSR Young Investigator Award, 2007

Significant Accomplishments

*   **C.N. Taylor**, U.S. Patent, "Two-dimensional Color Barcode with Preserved Plane and Lossy Plane Layers," Patent # 7,118,041, 10 Oct 2006

Research Interest Areas

*   Vision-aided navigation
*   Particle Filters
*   Kalman Filters

*   Distributed Data Fusion
*   Uncertainty Estimation

Dr. Michael A. Temple

PhD, Electrical Engineering, Air Force Institute of Technology

Professor of Electrical Engineering

Most Notable Publications

Voetberg, Benjamin J., et.al., "Using Active DNA Fingerprinting to Discriminate AJP Conductive Ink Elements Embedded in Integrated Circuits," *Distribution D, Jour of DoD Rsrch & Engr (JDR&E)*, Special Edition, Vol. 2 (2) 2-12, August 2019.

Rondeau, Christopher **M., Temple**, Michael A., and Lopez, Juan, "Industrial IoT Cross-Layer Forensic Investigation," *Wiley Interdisciplinary Reviews (WIREs): Forensic Science*, WIREs Forensic Sci. 2019;1:e1322, Vol. 1, No. 1, December 2018, https://doi.org/10.1002/wfs2.1322.

Talbot, Christopher **M., Temple**, Michael A., Carbino, Timothy J., and Betances, Addison, "Detecting Rogue Attacks on Commercial Wireless Insteon Home Automation Systems," *Computers & Security, No. 74*, pp. 296-307, May 2018, https://www.sciencedirect.com/science/article/pii/S0167404817302055.

Bihl, Trevor J., Bauer, Kenneth W., and **Temple, Michael A.**, "Feature Selection for RF Fingerprinting with MDA and Using ZigBee Device Emissions," *IEEE Trans on Info Forensics & Security*, Vol 11, Issue 8, pp. 1862-1874, Aug 2016, https://ieeexplore.ieee.org/stamp/stamp.jsp?arnumber=7464336.

Reising, Donald R., **Temple, Michael A.**, and Jackson, Julie A., "Authorized and Rogue Device Discrimination Using Dimensionally Reduced RF-DNA Fingerprints," *IEEE Trans on Info Forensics and Security*, Vol. 10, Issue. 6, pp. 1180-1192, June 2015, https://ieeexplore.ieee.org/document/7031931.

Significant Accomplishments

- W.E. Cobb, **M.A. Temple**, R.O. Baldwin, E. Garcia, E. Laspe, U.S. Patent, "Intrinsic Physical Layer Authentication of Integrated Circuits," Patent # 9,036,891, 19 May 15.

Research Interest Areas

- Discovery, extraction and exploitation of Distinct Native Attribute (DNA) fingerprinting features supporting offensive, defensive and exploitive communication network operations.
- Device hardware identity and/or device normal vs. anomalous (aged, failed, attacked, etc.) operating state discrimination.

Dr. Andrew J. Terzuoli, Jr.

PhD, Electrical Engineering, The Ohio State University

Associate Professor of Electrical Engineering

Most Notable Publications

Lawrence Lee, Ivan Frasure, Trevor Nartker, Ronald Marhefka, Joseph Sugrue, **Andrew Terzuoli**, Raymond Wasky, "Deployable Cruciform Reflector Antenna With Crossed-Dipole Array Feed For L-Band Remote Sensing," *Proceedings of the 2018 IEEE International Geoscience and Remote Sensing Symposium (IGARSS 2018)*, Valencia, SP, 22-27 July 2018.

Bertus Shelters, Brannon Elmore, James Ethridge, Jaclyn Schmidt, Jarred Burley, Steven Fiorino, Joseph Sugrue, **Andrew Terzuoli**, "Calculation Of Long-Term Tropospheric Attenuation Statistics Using Weather Cubes." *Proceedings of the 2018 IEEE International Geoscience and Remote Sensing Symposium (IGARSS 2018)*, Valencia, SP, 22-27 July 2018.

Lawrence Lee, Ivan Frasure, Trevor Narker, Ronald Marhefka, Joseph Sugrue, **Andrew Terzuoli**, Raymond Wasky, "Tightly-Packed Crossed-Dipole Array for L-band Satellite Communications," *Proceedings of the 2018 IEEE Symposium on Antennas and Propagation and USNC/URSI Radio Science Meeting (APS/URSI)*, Boston, MA, 8-13 July 2018.

Bertus Shelters, Brannon Elmore, James Ethridge, Jaclyn Schmidt, Jarred Burley, Steven Fiorino, Joseph Sugrue, **Andrew Terzuoli**, "Attenuation Statistics Derivation in the V&W Band Using Weather Cubes," *Proceedings of the 2018 IEEE Symposium on Antennas and Propagation and USNC/URSI Radio Science Meeting (APS/URSI)*, Boston, MA, 8-13 July 2018.

D. Smith, P. Collins, J. Fee, J. Petrosky, **A. Terzuoli**, C. Yardim, "Ionospheric Effects on Communication Signals in the V and W Bands," *Proceedings of the 23rd Union Radio Scientifique Internationale General Assembly and Scientific Symposium (URSI 2017 GASS)*, Montreal, QUE, Can, 19-26 Aug 2017.

Significant Accomplishments

- Fellow of the Electromagnetics Academy (FEMA) (Present)

- IEEE Life Senior Member (Present)

Research Interest Areas

- Antennas and Electromagnetics
- Computer Model Based Studies
- Application of Parallel Computation, VLSI Technology, and RISC Architecture to Numerical and Transform Methods
- Remote Sensing & Communication
- Passive RF Sensing
- Wave Scattering, Radar Cross Section, and Stealth (LO/CLO) Technology
- Machine Vision and Image Processing
- Automated Object Recognition

Capt Matthew J. Vincie

PhD, Electrical and Computer Engineering, Air Force Institute of Technology

Deputy Director of AFIT Nanofabrication and Characterization Facility

Assistant Professor of Electrical Engineering

Research Interest Areas

- Solid-state Devices

- Micro-electromechanical Systems

- Monolithic Microwave Integrated Circuits

- Analog Circuit Design

- RF and Microwave Engineering

- Optoelectronics

- Vacuum Tube Devices

- Instrumentation and Measurement

- Control Systems
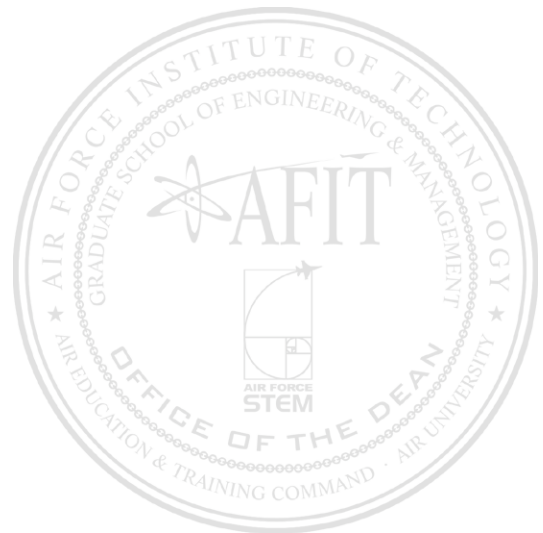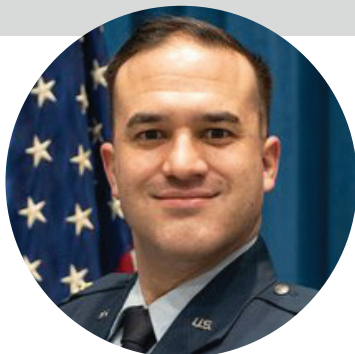
Maj Timothy S. Wolfe

PhD, Electrical Engineering, Purdue University

Assistant Professor of Electrical Engineering

Most Notable Publications

T.S. Wolfe, R.M. Van Ginhoven, A. Strachan, "Computational study of first-row transition metals in monodoped 4H-SiC," *Modelling Simul. Mater. Sci. Eng.*, vol. 29, no. 055008, 2021.

T.S. Wolfe, S.A. Francis, D. Langley, J.C. Petrosky, J. Roos, A. Terzuoli, T. Zens, "Integrated Computational Investigation of Photoconductive Semiconductor Switches in Pulsed Power Radio Frequency Applications," *IEEE Trans. Plas. Sci.*, vol. 44, no. 1, 2016.

T.S. Wolfe, S.A. Francis, D. Langley, J.C. Petrosky, J. Roos, A. Terzuoli, T. Zens, "Waveguide Mode Formation as a Potential Cause of Switch Failure in High-Power Wide-Bandgap Photoconductive Switches," *IEEE Trans. Plas. Sci.*, vol. 43, no. 12, 2015.

Selected Honors & Awards

- 2019 Best Graduate Student Presentation, INMM Conference on Active Nonproliferation

- 2015 Company Grade Officer of the Quarter, AFIT

Research Interest Areas

- Microelectronics, Power Electronics, Optoelectronics/Photonics, Solid State Physics, Condensed Matter Physics, Device Modeling and Simulation (M&S), Computational Chemistry, Atomistic Modeling, Ab Initio M&S, Semiconductor Point Defects, Directed Energy, High Power Electromagnetic (HPEM) Systems
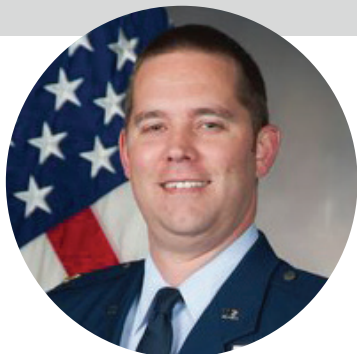
Lt Col Kenneth W. Burgi

PhD, Engineering Physics, Air Force Institute of Technology

Department Head, Engineering Physics

Assistant Professor of Optical Engineering

Most Notable Publications

Nagamine, Eric K., **Kenneth W. Burgi**, and Samuel D. Butler. "Beam Formation and Vernier Steering Off of a Rough Surface," *Micromachines* 12.8 (2021): 871.

Burgi, Kenneth, Michael Marciniak, Mark Oxley, and Stephen Nauyoks. "Measuring the reflection matrix of a rough surface." *Applied Sciences 7*, no. 6 (2017): 568.

Burgi, Kenneth, Jessica Ullom, Michael Marciniak, and Mark Oxley. "Reflective inverse diffusion." *Applied Sciences 6*, no. 12 (2016): 370.

Nagamine, Eric K., **Kenneth W. Burgi**, Samuel D. Butler, and Michael A. Marciniak. "Nonmechanical beam-steering in reflective inverse diffusion." In *Laser Beam Shaping XIX*, vol. 11107, p. 1110706. International Society for Optics and Photonics, 2019.

Burgi, Kenneth W., Michael A. Marciniak, Stephen E. Nauyoks, and Mark E. Oxley. "Exploiting redundant phase information of a reflection matrix." In *Optical Trapping and Optical Micromanipulation XIV*, vol. 10347, p. 103470K. International Society for Optics and Photonics, 2017.

Selected Honors & Awards

- Meritorious Service Medal (2020)
- Air Force Commendation Medal, 1st Oak Leaf Cluster (2013)
- Air Medal, 10th Oak Leaf Cluster (2012)
- Aerial Achievement Medal (2012)
- Air Force Achievement Medal (2005)
- Afghanistan Campaign Medal with 3 devices
- Iraq Campaign Medal with 2 Devices
- Global War on Terrorism Expeditionary Medal
- Global War on Terrorism Service Medal

Significant Accomplishments

- C-17A Instructor Aircraft Commander
- MC-12W Mission Commander
- 2,605 Flight Hours / 617 Sorties
- 1,295 Combat Flight Hours / 363 Combat Sorties

Research Interest Areas

- Scatterometry
- Statistical and adaptive optics
- Various aspects of light-matter interaction

Dr. William F. Bailey

PhD, Air Force Institute of Technology

Associate Professor Emeritus of Physics

Most Notable Publications

William J. Palm, Michael A. Marciniak, Glen P. Perram, Kevin C. Gross and **William F. Bailey**, "Wavelength and temperature-dependence of CW laser absorptance in Kapton thin films", *Optical Engineering*, Vol. 51 No. 12, 2012.

J.W. Englert, J.C. Petrosky, **W.F. Bailey**, and J.W. McClory, A. Heger, L. Tauxe, D. R. Watts, "Estimating Peak EMP Magnetic Fields Using Alternating Field Demagnetization", *Journal of Radiation Effects, Research and Engineering*, vol. 30, no. 1, pp.103-112, February 2012.

Cusumano, S.J., Fiorino, S. T., Bartell, R. J., Krizo, M. J. , **Bailey, W. F.**, Beauchamp R. L. , Marciniak, M. A., "Modeling Bistatic spectral measurements of temporally evolving reflected and emitted energy from a distant and receding target", *Journal of Applied Remote Sensing*, Vol. 5, Sept 2011.

Josyula, E., **Bailey, W.F.** and Suchyta, III, C.J., "Dissociation Modeling in Hypersonic Flows Using State-to-State Kinetics", *Journal of Thermophysics and Heat Transfer,* Vol. 25, No. 1, Jan-Mar 2011.

Selected Honors & Awards

- AF Outstanding Science and Engineering Educator—AFIT 2012

- AETC Merewether Award—AFIT 2004

- Professor Ezra Kotcher Award—AFIT 1993

Significant Accomplishments

- Developed Directed Energy Curriculum

- Developed Space Environment Curriculum

- Initiated discussions with Director of Weather that led to approval of new program—Atmospheric Science

Research Interest Areas

- Atomic and Molecular Physics
- Computational Fluid Dynamics
- High Power Microwave Systems
- Simulation Modeling and Analysis

Dr. Abigail A. Bickley

PhD, Chemistry, University of Maryland

Research Assistant Professor of Nuclear Engineering

Most Notable Publications

M. R. Halstead, S. Lee, J. Petrosky, **A. Bickley**, J. W. McClory, S. Clark, P. Sokol, "Neutron Flux Spectrum Characterization of a Compact, Accelerator-Driven Neutron Source at Indiana University," *Journal of Radiation Effects, Research and Engineering*, 31, 117, (2013).

A. A. Bickley, M. R. Halstead, J. W. McClory, S. Lee, P. Sokol, J. C. Petrosky, "Evaluation of the Neutron Energy Spectrum Produced at the Neutron Radiation Effects Beam Line Utilizing a Computational Monte Carlo Approach," *Journal of Radiation Effects, Research and Engineering*, 31, 23, (2013).

A. A. Bickley, G.K. Demaree, J. W. McClory, W. H. Miller, T. M. Oakes, J. C. Petrosky, "Design optimization of a layered boron based solid state neutron spectrometer," *Nuclear Science Symposium and Medical Imaging Conference,* IEEE, 4872 (2011).

*Classified publications since 2013

Significant Accomplishments

- Developed PhD-level Advanced Nuclear Forensics Classes taught at the Secret/CNWDI level

- Developed MS-level Technical Nuclear Forensics Course taught at the Secret/CNWDI level

- Referee for the NA-22 program for the National Nuclear Security Administration of the US Department of Energy

- Computational support for several National Labs, and HPC at AFRL/DSRC

- Mentorship of post-doctoral researchers, interns, research assistants, and PhD students

- Member, Nuclear Event and Analysis Testing Center for Specialized Research

Research Interest Areas

- Radiation transport and modeling
- Optimization of nuclear systems
- Pre- and post-detonation nuclear forensics
- Nuclear weapons effects

Dr. Santasri R. Bose-Pillai

PhD, Electrical Engineering, New Mexico State University

Research Assistant Professor of Engineering Physics

Most Notable Publications

Steven Fiorino, **Santasri Bose-Pillai** and Kevin Keefer, "Revisiting acoustic sounding to advance the measurement of optical turbulence," *Applied Sciences*, vol. 11, no. 16, 7658, Aug 2021, DOI: 10.3390/app 11167658.

Benjamin Wilson, **Santasri Bose-Pillai**, Jack McCrae, Kevin Keefer and Steven Fiorino, "Estimating turbulence distribution over a heterogeneous path using time-lapse imagery from dual cameras," *Applied Sciences*, vol. 11, no. 13, 6221, Jul 2021, DOI: 10.3390/app11136221.

Santasri R. Bose-Pillai, Jack E. McCrae, Christopher A. Rice, Ryan A. Wood, Connor E. Murphy, and Steven T. Fiorino, "Estimation of atmospheric turbulence using differential motion of extended features in time-lapse imagery", *Optical Engineering*, vol. 57, no. 10, 104108 (14 pp.), Oct 2018, DOI: 10.1117/1. OE.57.10.104108.

Milo W. Hyde, **Santasri R. Bose-Pillai**, and Ryan A. Wood, "Synthesis of non-uniformly correlated partially coherent sources using a deformable mirror," *Applied Physics Letters*, vol. 111, no. 10, 101106 (5 pp.), Sep 2017, DOI: 10.1063/1.4994669.

Milo W. Hyde IV, **Santasri Basu**, David G. Voelz, and Xifeng Xiao, "Experimentally generating any desired partially-coherent Schell-model source using phase-only control," *Journal of Applied Physics*, vol. 118, no. 9, 093102 (10 pp.), Sep 2015, DOI: 10.1063/1.4929811.

Research Interest Areas

- Atmospheric turbulence characterization using optical techniques
- Mitigation of turbulence effects and turbulence compensation in directed energy
- Laser communications and imaging applications
- Synthesis of partially coherent sources and their propagation through turbulence

Selected Honors & Awards

- Elected senior member of Optica (formerly Optical Society of America) and SPIE, the International Society for Optics and Photonics for outstanding contributions in the field of Optics.

Significant Accomplishments

- Elected Chair of Optica's Laser Systems technical group.

Patent and Patent applications:
1. Santasri R. Bose-Pillai, Jack E. McCrae, Benjamin C. Wilson and Steven T. Fiorino, "Profiling of Atmospheric Turbulence using Time-Lapse Imagery of Non-Cooperative Targets from Multiple Spatially Separated Cameras," AFD-1990P2. Provisional application filed on 15 June 2021, with the U.S. Patent and Trademark Office. The application was accorded U.S. Serial No. 63/210,693.

2. Santasri R. Bose-Pillai, Jack E. McCrae, Christopher A. Rice, and Steven T. Fiorino, "Estimation of Atmospheric Turbulence Parameters using Differential Motion of Extended Features in Time-lapse Imagery," AFD 1990. Non-provisional application filed on 22 October 2020. The application was accorded U.S. Serial No. 17/077,323.

3. Milo W. Hyde IV and Santasri R. Bose-Pillai, "Generation of Vector Partially Coherent Optical Sources Using Phase-Only Spatial Light Modulators", Patent No. 10809626, October 2020.

Dr. Larry W. Burggraf

PhD, Chemistry, University of Denver

Professor of Chemical and Engineering Physics

Most Notable Publications

"Semiconductor color-center structure and excitation spectra: Equation-of-motion coupled-cluster description of vacancy and transition-metal defect photoluminescence," J. J. Lutz, X. F. Duan, and **L. W. Burggraf**, *Physical Review B*, 97, 115108 (2018).

"The closo-Si12C12 molecule from cluster to crystal: A theoretical prediction," Xiaofeng F. Duan and **Larry W. Burggraf**, *J. Chem. Phys.* 144, 114309 (2016).

"Searching for stable SinCn Clusters: Combination of Stochastic Potential Surface Search and Pseudopotential Plane-Wave Car-Parinello Simulated Annealing Simulations," Xiaofeng F. Duan, **Larry W. Burggraf** and Lingyu Huang, *Molecules*, 18, 8591-8606 (2013).

"A Modulating Liquid Collimator for Coded Aperture Adaptive Imaging of Gamma-Rays," Jack G. M. FitzGerald, **Larry W. Burggraf**, Benjamin R. Kowash, and Ethan L. Hull, *IEEE Transactions on Nuclear Science*, Vol. 60, No. 3, 2300-2307 (June 2013).

"Three-dimensional electron-positron momentum distribution of O3+-irradiated 6H SiC using two positron spectroscopy techniques simultaneously," Christopher Williams, **Larry Burggraf**, Paul Adamson and James Petrosky, *J. Phys. Conf. Ser.* 262(1) 012064 (2011).

Selected Honors & Awards

- Recognized by Dr Ahmed Zewail (Nobel Laureate) in June 2009 Plenary Address at San Diego HPC Conference and in his autobiography "Voyage Through Time"

Patents:
- Larry W. Burggraf, Benjamin R. Kowash, Jack G. M. FitzGerald, "Reconfigurable liquid attenuated collimator", Aug 30, 2016, US9431141 B1

- Holland, D., Olesen, R., Burggraf, L., O'Day, B., Bevins, J. 2019. "Rotating Scatter Mask Design Classes for Directional Radiation Detection and Imaging." U.S. Patent Application 62,816,435, filed March 11, 2019. Patent Pending.

- Olesen, R., Egner, B., Holland, D., Martin, V., Bevins, J. 2019. "An Efficient, Dual-particle Directional Detection System using a Rotating Scatter Mask." U.S. Patent Application 62,816,451, filed March 11, 2019. Patent Pending.

Significant Accomplishments

- 2013 Nuclear Deterrence Operations Professional Team of the Year Award at the Air Education and Training Command level.

- Air Force Special Service Award (1994)

- AFRL HEDM Program ISp Award (1992)

- Air Force Institute of Technology PhD CI Distinguished Graduate (1981)

Research Interest Areas

- Positron spectroscopy
- Gamma Imaging
- Radioisotope propulsion
- Surface chemistry

- Molecular spectroscopy
- Laser printing of refractor alloys in concert with quantum chemistry calculations to solve DoD problems and create new capabilities

Lt Col Samuel D. Butler

PhD, Applied Physics, Air Force Institute of Technology

Assistant Professor of Physics

Most Notable Publications

Small, T. V., **S. D. Butler**, and M. A. Marciniak. "Solar cell BRDF measurement and modeling with out-of-plane data." *Opt. Express* 29, 35501-35515 (2021).

Bishop, M. W., **S. D. Butler**, and M. A. Marciniak. "Robust method of determining microfacet BRDF parameters in the presence of noise via recursive optimization," *Opt. Eng.* 60(9), 094103 (2021).

Ewing, B. E., **S. D. Butler**, and M. A. Marciniak. "Improved grazing angle bidirectional reflectance distribution function model using Rayleigh–Rice polarization factor and adaptive microfacet distribution function," *Opt. Eng.* 57, 1 (2018).

Butler, S. D., S. E. Nauyoks, and M. A. Marciniak. "Comparison of microfacet BRDF model to modified Beckmann-Kirchhoff BRDF model for rough and smooth surfaces," *Opt. Express* Vol. 23, No. 22, pp. 29100-29112 (2015).

Butler, S. D., S. E. Nauyoks, M. A. Marciniak. "Experimental analysis of bidirectional reflectance distribution function cross section conversion term in direction cosine space," *Optics Letters* Vol. 40, No. 11, pp. 2445-2448 (2015).

Selected Honors & Awards

- Meritorious Service Medal
- Joint Service Commendation Medal with 1 device
- Air Force Commendation Medal
- Joint Service Achievement Medal
- Air Force Achievement Medal with 1 device
- Afghanistan Campaign Medal with 2 devices
- Global War on Terrorism Expeditionary Service Medal
- Nuclear Deterrence Operations Service Medal with 'N' Device

Significant Accomplishments

- Deployed to Southwest Asia in direct support of combat operations during Operation: INHERENT RESOLVE.

- Deployed to Afghanistan in direct support of combat operations during Operation: ENDURING FREEDOM.

- Awarded Afghanistan Campaign Ribbon with 2 devices, and Global War on Terrorism Expeditionary Ribbon.

Research Interest Areas

- Optical scatter
- Quantum information

Maj Timothy I. Calver

PhD, Applied Physics, Air Force Institute of Technology

Assistant Professor of Physics

Most Notable Publications

T. I. Calver, W. A. Bauer, C. A. Rice, and G. P. Perram, "Shock front behavior during pulsed laser ablation of graphite," *Optical Engineering*, 60, 057103, May 2021

T. Calver, M. Grimaila, and J. Humphries, "An empirical analysis of the cascade error reconciliation protocol for quantum key distribution," *Proceedings of the Seventh Annual Workshop on Cyber Security and Information Intelligence Research*, October 2011.

Selected Honors & Awards

- Air Force Technical Applications Center Directorate Field Grade Officer of the Quarter, 2018

- US Secretary of State Commendation, 2016

- Arnold Engineering Development Center Company Grade Office of the Quarter, 2012

- AFRL Sensors Directorate Company Grade Office of the Quarter, 2011

- AFRL Sensors Directorate Junior Military Engineer of the Year, 2010

- Air Force Office of Scientific Research Star Team, 2008-2011

- Air and Space Basic Course Top Performer, 2006

- Honor Societies: Tau Beta Pi, Eta Kappa Nu

Research Interest Areas

- Pulsed Laser Ablation
- Laser Damage Assessment
- Optical Diagnostics
- Lasers and Optics

LTC Andrew W. Decker

PhD, Nuclear Engineering, University of Tennessee, Knoxville

Assistant Professor of Nuclear Engineering

Most Notable Publications

A.W. Decker, C.J. Delzer, S. Hok, N.J. Cherepy, and J.P. Hayward, "X-ray Characterization Using a Bismuth-Loaded Polyvinyl Toluene Array," *Journal of Radiation Effects*, Research and Engineering, vol. 39, no.1, pp. 11-21, Apr. 2021.

A.W. Decker, N.J. Cherepy, S. Hok and J.P. Hayward, "Simulated X-Ray Radiographic Performance of a Bismuth-Loaded PVT Array," *Transactions on Nuclear Science*, vol. 67, no. 11, pp. 2329-2336, Nov. 2020, DOI: 10.1109/TNS.2020.3029498.

S. McHale, **A. Decker**, "Estimating radiation protection factor (RPF) values for a simple surrogate vehicle using the MCNP6.1 code," *Applied Radiation and Isotopes*, vol. 153, July 2019.

A.W. Decker, "Verification and Validation Report for the Radiation Protection Factor Methodology using the Monte Carlo N-Particle Code," version 6. (Fort Belvoir, VA: U.S. Defense Threat Reduction Agency) (2018) DTRA-TR-18-71.

A.W. Decker, S.R. McHale, M.P. Shannon, J.A. Clinton, J.W. McClory, "Novel Bonner Sphere Spectrometer Response Functions Using MCNP6," *Transactions on Nuclear Science*, IEEE, vol.62, no.4, pp.1689-1694, Aug. 2015.

Selected Honors & Awards

- Defense Meritorious Service Medal
- Bronze Star (1 OLC)
- Meritorious Service Medal

Significant Accomplishments

- Lead Researcher for DTRA Radiation Protection Factor research for four years (2014-2018), completing the early V&V of MCNP6 for the task and publishing a DoD Technical Report (DTRA-TR-18-71) from the assembled research.

Research Interest Areas

- Radiation Protection Factor (RPF) Calculations for Military Vehicles
- Neutron and Photon Radiography
- Characterization of Novel Plastic Scintillators for Dual Particle Radiography measurements
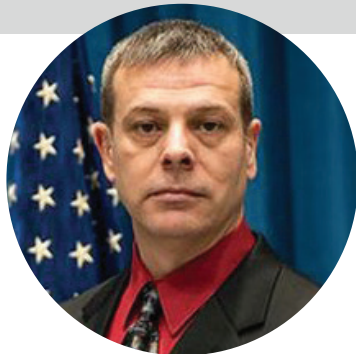
Dr. Michael L. Dexter

PhD, Nuclear Physics, Air Force Institute of Technology

Director, AFIT Center for Technical Intelligence Studies and Research

Assistant Professor of Nuclear Engineering

Most Notable Publications

M. L. Dexter, J. W. McClory, and B. R. Kowash, "Investigation and Development of Forensic Techniques for Estimating the Mass-To-Yield Ratio of a Nuclear Detonation with Remote Optical Sensors," *Journal of Radiation Effects, Research and Engineering*, vol. 34, no. 1, pp. 43-52, December 2016.

Significant Accomplishments

- Completed a deployment in 2019 as a member of a Joint Task for support of Operation Inherent Resolve as a Subject Matter Expert (SME) for combating weapons of mass destruction (CWMD).

- Developed PhD course in Advanced Nuclear Forensics taught at the Secret/CNWDI level.

- Deployed in November 2018 to Northern Iraq in support of Operation Inherent Resolve as the first-ever subject matter expert (SME) for combating weapons of mass destruction (CWMD).

Research Interest Areas

- Nuclear Weapons Effects
- Nuclear forensics
- High energy density plasma physics

- Optical transport
- Digital image processing and analysis
- High energy laser interactions

LTC Christina L. Dugan

PhD, Nuclear Science, Air Force Institute of Technology

Director, Nuclear Expertise for Advancing Technologies

Assistant Professor of Nuclear Engineering

Most Notable Publications

C. Dugan, C. Young, R. Carmona, M. Schneider, J. Petrosky, J. M. Mann, E. Hunt, and J.W. McClory, "The Debye Temperature of a Single Crystal Thorium Uranium Dioxide Alloy," *Physica Status Solidi – Rapid Research Letters*, vol. 12, no. 12, 1800436 (5 pages), December 2018.

C. Dugan, G. Peterson, A. Mock, C. Young, J. M. Mann, M. Nastasi, M. Schubert, L. Want, W. Mei, L. Tanabe, P. Dowben, and J. Petrosky, "Electrical and Material Properties of Hydrothermally Grown Single Crystal (111) UO2," *The European Physical Journal B*, 91:67, April 2018.

C. Dugan, R. Hengehold, S. McHale, J. Santana, J. McClory, V. Adamiv, Y. Burak, Y. Losovyj and P. Dowben, "Reversible Mn Segregation at the Polar Surface of Lithium Tetraborate," *Applied Physics Letters*, vol. 102, 161602 (4 pages), April 2013.

C. Dugan, R. Hengehold, S. McHale, Ya. Losovyj, J. W. McClory, and J. Petrosky, "Photoemission and Cathodoluminescence of Doped Lithium Tetraborate Crystals Being Developed for Neutron Detection," *Material Research Society Symposium*, vol. 134, Nuclear Radiation Detection Materials, July 2011.

Knight, **C. Dugan**, J. Petrosky, A. Mock, P. Dowben, J.M. Mann, M. Kimani, and M. Schubert, "Infrared-Active Phonon Modes in Single-Crystal Thorium Dioxide and Uranium Dioxide," *Journal of Applied Physics*, 127, 125103, March 2020.

Selected Honors & Awards

- USAFA Basic Science Division Instructor of the Quarter (Spring 2012)
- Tau Beta Pi and Sigma Pi Sigma Honor Societies
- Top 10 Finalist in 2011 National Security Innovation Competition
- U.S. Army Deployment Excellence Award, Small Unit Category – 2020
- U.S. Army MG William L. Sibert Award – Best CBRN Unit – 2020
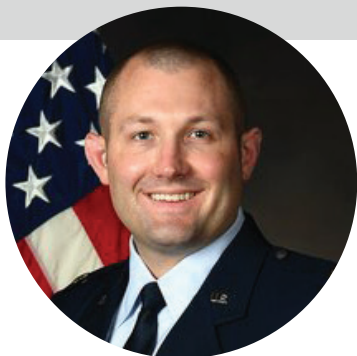
Significant Accomplishments

- Director of AFIT's Nuclear Expertise for Advancing Technologies (NEAT) Center

Research Interest Areas

Laser-Induced Breakdown Spectroscopy (LIBS) for nuclear forensics purposes, Surface science and material properties research via Cathodoluminescence and Photoemission Spectroscopy

Maj Daniel J. Emmons

PhD, Applied Physics, Air Force Institute of Technology

Assistant Professor of Applied Physics

Most Notable Publications

Emmons, D. J., & Weeks, D. E. (2019). Effect of Ar(3p54p; 2p) + M => Ar(3p54s; 1s) + M branching ratio on optically pumped rare gas laser performance. Accepted for publication in *Optics Express*, 11 Nov 2019.

Emmons, D. J., Weeks, D. E., Eshel, B., & Perram, G. P. (2018). Metastable Ar (1s5) density dependence on pressure and argon-helium mixture in a high pressure radio frequency dielectric barrier discharge. *Journal of Applied Physics*, 123(4), 043304.

Emmons, D. J., & Weeks, D. E. (2017). Kinetics of high pressure argon-helium pulsed gas discharge. *Journal of Applied Physics*, 121(20), 203301.

Research Interest Areas

- Ionospheric Disturbances
- Gas Discharges
- Laser & Plasma Kinetics

Dr. Jonathan W. Evans

PhD, Optical Sciences and Engineering, Air Force Institute of Technology

Assistant Professor of Engineering Physics

Most Notable Publications

Jonathan W. Evans, Thomas R. Harris, Eric J. Turner, Martin M. Kimani, J. Matthew Mann, Ronald W. Stites, Gary Cook, Kenneth L. Schepler, "Re-absorption and nonradiative energy transfer in vibronic laser gain media," *Opt. Eng*. 60(5) 056103 (19 May 2021).

Jonathan W. Evans, Ronald W. Stites, Thomas R. Harris, "Increasing the performance of an Fe:ZnSe laser using a hot isostatic press," *Optical Materials Express*, Volume 7, Issue 12, 2017, Pages 4296-4303.

Tigran Sanamyan, **Jonathan W. Evans**, and Sean A. McDaniel, "Path to doubling the efficiency of mid-IR erbium lasers," *Opt. Express* 25, 16452-16457 (2017).

Jonathan W. Evans, Brian D. Dolasinski, Thomas R. Harris, Justin W. Cleary, and Patrick A. Berry, "Demonstration and power scaling of an Fe:CdMnTe laser at 5.2 microns," O*pt. Mat. Express* 7, 860-867 (2017).

J. W. Evans, P. A. Berry and K. L. Schepler, "A Passively Q-Switched, CW-Pumped Fe:ZnSe Laser," in *IEEE Journal of Quantum Electronics*, vol. 50, no. 3, pp. 204-209, (March 2014).

Selected Honors & Awards

- 2021 – William F. Bahret Technical Excellence Award, Systems Technology Office, AFRL/STO
- 2019 – AFRL Science and Engineering Early Career Award, AFRL Headquarters, AFRL/CC
- 2019 – Exemplary Civilian Service Award, AFRL Headquarters, AFRL/CC, AF-level
- 2018 – Brian M. Henderson Memorial Award, ADIOS Team, Sensors Directorate AFRL/RY
- 2015 – Member, AFOSR STAR Team CY12-CY15, CY09-CY11

Significant Accomplishments

- Senior Member of Optical (formerly OSA)
- Chair: Fundamental Laser Sciences Technical Group (Optica)
- Guest Editor, Optical Engineering 57 (2), 021201: Special Section Guest Editorial: Solid-State Lasers (2017)
- Laser publication highlighted in Laser Focus World, April 2017

Research Interest Areas

- Mid-Infrared Solid State Laser Architectures
- Vibronic Laser Materials
- Nonlinear optical parametric sources
- Laser Beam Control
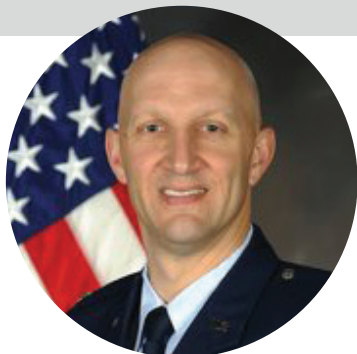
Col James R. Fee Jr.

PhD, Nuclear Engineering, Air Force Institute of Technology

Associate Dean, Graduate School of Engineering & Management

Assistant Professor of Nuclear Engineering

Most Notable Publications

J. R. Fee, J. C. Petrosky, "Medium-Altitude Electromagnetic Pulse (EMP) Model Requirements and Development", *Journal of Radiation Effects*, 33(1), 78-84 (May 2015).

J. R. Fee, J. C. Petrosky, B. F. Akers, "Reestablishing an Air Burst EMP Simulation Capability", *Journal of Radiation Effects.*

J. R. Fee, J. C. Petrosky, "Validation of the Air Burst EMP Simulation Capability", B-Code*, Journal of Radiation Effects.*

J. R. Fee, J. C. Petrosky, "Validation of the Air Burst EMP Simulation Capability", *B-code*, *2016 Hardened Electronics and Radiation Technology Conference*, Monterey, CA, 16-20 April 2016.

Selected Honors & Awards

- Meritorious Service Medal with 3 Oak Leaf Clusters, 2019

- Lt Col Charles P. Brothers Outstanding Volunteer Service Award, 2015

- Defense Meritorious Service medal with 2 Oak Leaf Clusters, 2011

Research Interest Areas

- Effects of Nuclear Weapons
- Simulations of Electromagnetic Pulses

Dr. Steven T. Fiorino

PhD, Physical Meteorology, Florida State University

Director, AFIT Center for Directed Energy

Professor of Atmospheric Physics

Most Notable Publications

Fiorino, S.T., S.R. Bose-Pillai, J.E. Schmidt, B.J. Elmore, K.J. Keefer, 2020: "Implications of 4D weather cubes for improved cloud free line of sight assessments of free space optical communications link performance," *Opt. Eng.* 59(8), 081808, doi: 10.1117/1. OE.59.8.081808.

McCrae, J.E., S. Bose-Pillai, and **S.T. Fiorino**, 2017: "Estimation of turbulence from time-lapse imagery," *Opt. Eng.* 0001; 56(7):071504. DOI: 10.1117/1.OE.56.7.071504.

Burley, J.L., **S.T. Fiorino**, B. Elmore, and J. Schmidt, 2017: "A Fast Calculating Two-Stream-Like Multiple Scattering Algorithm that Captures Azimuthal and Elevation Variations," *J. Appl. Meteor. Climatol*. 56:11, pp. 3049-3063. DOI:10.1175/JAMC-D-17-0044.1.

McCrae, J.E., S. Bose-Pillai, and **S.T. Fiorino**, 2017: "Estimation of turbulence from time-lapse imagery," *Opt. Eng.* 0001; 56(7):071504. doi:10.1117/1.OE.56.7.071504.

Fiorino, S.T., R.M. Randall, M.F. Via*, and J.L. Burley*, 2014: "Validation of a UV-to-RF high-spectral-resolution atmospheric boundary layer characterization tool," *J. Appl. Meteor. Climatol.* Vol 53, No. 1, pp. 136-156.

Selected Honors & Awards

- Promoted to full Professor with tenure August 2019

- Promoted from Research Associate Professor to tenure-track Associate Professor, May 2016

Significant Accomplishments

- Chair, Modeling and Simulation Technical Area Working Group, Joint Directed Energy Transition Office

- Appointed to NATO STO Technical Team: SCI-316 on High Energy Laser Weapons: Quantifying the Impact of Atmospherics and Reflections

Research Interest Areas

- Microwave remote sensing of the environment
- Development of weather signal processing algorithms
- Atmospheric effects on military systems such as high energy lasers and weapons of mass destruction

Lt Col Kyle E. Fitch

PhD, Atmospheric Sciences, University of Utah

Chair, Atmospheric Science Program

Assistant Professor of Atmospheric Science

Most Notable Publications

Fitch, K. E., Hang, C., Talaei, A., & Garrett, T. J. (2021). "Arctic observations and numerical simulations of surface wind effects on Multi-Angle Snowflake Camera measurements," *Atmospheric Measurement Techniques*, 14(2), 1127-1142, https://doi.org/10.5194/amt-14-1127-2021.

Dunnavan, E. L., Jiang, Z., Harrington, J. Y., Verlinde, J., **Fitch, K. E.**, Garrett, T. J. (2019). "The shape and density evolution of snow aggregates," *Journal of the Atmospheric Sciences*, 76(12), 3919-3940, https://doi.org/10.1175/JAS-D-19-0066.1.

Fitch, K. E., Hutchison, K. D., Bartlett, K. S., Wacker, R. S., Gross, K. C. (2016). "Assessing VIIRS cloud base height products with data collected at the Department of Energy Atmospheric Radiation Measurement sites," *International Journal of Remote Sensing*, 37(11), 2604-2620, https://doi.org/10.1080/01431161.2016.1182665.

Selected Honors & Awards

- AFIT Dean's Award, Department of Engineering Physics 2016

- Advanced Technical Intelligence Outstanding Student Award 2016

- AFIT Distinguished Graduate 2016

- Meritorious Service Medal

- Air Force Commendation Medal, 1 OLC

- Army Commendation Medal

Significant Accomplishments

- Deployed to Afghanistan in direct support of Operation ENDURING FREEDOM, 2010-2011 & 2013-2014

Research Interest Areas

- Arctic cloud and precipitation physics
- Remote sensing of clouds

- Machine-learning-based image classification

Dr. Anthony L. Franz

PhD, Physics, University of Maryland, College Park

Research Assistant Professor of Physics

Most Notable Publications

Carlos D. Diaz, **Anthony L. Franz**, and Michael A. Marciniak. "Spatial resolution comparison of a diffractive plenoptic camera and an intermediate image diffractive plenoptic camera," *Optical Engineering* 58(12), 123102 (24 December 2019). https://doi.org/10.1117/1.OE.58.12.123102.

Jack A. Shepherd, **Anthony L. Franz**, "Evaluation of plenoptic algorithm performance for measuring scene spectra captured by a diffractive plenoptic camera," *Proc. SPIE* 10669, Computational Imaging III, 1066909 (14 May 2018); DOI: https://doi.org/10.1117/12.2303894.

Francis D. Hallada, **Anthony L. Franz**, Michael R. Hawks. "Fresnel zone plate light field spectral imaging," *Optical Engineering* 56(8), 081811 (2017). DOI: https://doi.org/10.1117/1.OE.56.8.081811.

A. L. Franz, R. Roy, L. B. Shaw, and I. B. Schwartz. "Effect of Multiple Time Delays on Intensity Fluctuation Dynamics in Fiber Ring Lasers," *Physical Review* E 78, 016208 (2008). DOI: https://doi.org/10.1103/PhysRevE.78.016208.

A. L. Franz, R. Roy, L. B. Shaw, and I. B. Schwartz. "Changing Dynamical Complexity with Time Delay in Coupled Fiber Laser Oscillators," *Physical Review Letters* 99, 053905 (2007). DOI: https://doi.org/10.1103/PhysRevLett.99.053905.

Selected Honors & Awards

- Southwestern Ohio Council for Higher Education (SOCHE) Faculty Excellence Award for the Department of Engineering Physics, AFIT (2017).

- AFIT and Air Education and Training Command winner for the 2014 Air Force Outstanding Scientist and Engineer of the Year Award, Senior Military Category, (2015).

- John T. McGrath award for best junior faculty member in the Department of Physics, U.S. Air Force Academy, (2003).

Significant Accomplishments

- Deployed, Rustamiyah, Iraq, Jan 2009 - July 2009

- Deployed, Kabul, Afghanistan, Oct 2010 - Nov 2011

Research Interest Areas

- Remote Sensing
- Hyperspectral Imaging
- Dynamics and Information in Complex Systems

Dr. Nancy C. Giles

PhD, Physics, North Carolina State University

Executive Associate Dean for Strategies

Professor of Physics

Most Notable Publications

"Zn Acceptors in beta-Ga_2O_3 crystals," T. D. Gustafson, J. Jesenovec, C. A. Lenyk, **N. C. Giles**, J.S. McCloy, M. D. McCluskey, and L. E. Halliburton, *Journal of Applied Physics*, vol. 129, article no. 155701 (10 pages) (April 2021).

"Photoinduced trapping of charge at sulfur vacancies and copper ions in photorefractive $Sn_2P_2S_6$ crystals," T. D. Gustafson, E. M. Golden, E. M. Scherrer, **N. C. Giles**, A. A. Grabar, S. A. Basun, D. R. Evans, J. E. Slagle, and L. E. Halliburton, *Journal of Applied Physics*, vol. 129, article no. 085702 (Feb 2021).

"Deep donor behavior of iron in beta-Ga_2O_3 crystals: Establishing the $Fe^{4+/3+}$ level," T. D. Gustafson, C. A. Lenyk, L. E. Halliburton, and **N. C. Giles**, *Journal of Applied Physics*, vol. 128, article no. 145704 (8 pages) (14 Oct 2020).

"Charge trapping by iodine ions in photorefractive $Sn_2P_2S_6$ crystals," E. M. Scherrer, **N.C. Giles**, T. E. R. Dodson, A. Grabar, D. Evans, S. Basun, J. Slagle, and L. E. Halliburton, *Journal of Chemical Physics*, vol. 153, article no. 144503 (9 pages) (13 Oct 2020).

"Experimental determination of the (0/-) level for Mg acceptors in β-Ga_2O_3 crystals," C.A. Lenyk, T.D. Gustafson, S.A. Basun, L.E. Halliburton, and **N.C. Giles**, *Applied Physics Letters*, vol. 116, article no. 142101 (5 pages) (April 2020).

Selected Honors & Awards

- Benedum Distinguished Scholar Award, West Virginia University (WVU)
- WVU Foundation Outstanding Teacher Award
- Outstanding Teacher Award, Eberly College of Arts and Sciences, WVU
- Outstanding Researcher Award, Eberly College of Arts and Sciences, WVU

Significant Accomplishments

- Over 5800 career citations of publications (under Giles or Giles-Taylor); h-index=40.
- Authored 205 refereed journal publications.
- Currently serving as strategist for increased STEM education and research outreach for AF personnel.

Two book chapters:
- "Electron Paramagnetic Resonance (EPR) from β-Ga_2O_3 crystals," **N. C. Giles** and L. E. Halliburton, Chapter 8, pp. 169-190, in *Gallium Oxide (Ga_2O_3): Technology, Devices and Applications*, edited by S. Pearton, M. Mastro, and F. Ren (Elsevier, 2018).
- "HgTe-CdTe Superlattices," J.R. Meyer, C.A. Hoffman, T.H. Myers, and **N.C. Giles**, Chapter 7, pp. 535-593, in *Handbook of Semiconductors: Materials, Properties, and Preparation*, Vol. 3a, edited by S. Mahajan (North Holland, Amsterdam, 1994).

Research Interest Areas

- Identification of point defects and device-limiting absorption bands in semiconducting and optical materials
- Inorganic crystalline materials (bulk, thin films) for defense countermeasures and high-power mid-IR lasers
- Photoluminescence, absorption, thermoluminescence, and magnetic resonance spectroscopy of point defects in crystals

Dr. Michael R. Hawks

PhD, Optical Sciences, Air Force Institute of Technology

Research Assistant Professor

Most Notable Publications

Thomas, R. Cobb, S. Fiorino, **M.R. Hawks**, "SNR modeling for ground-based daytime imaging of GEO-satellites in the SWIR", *2019 IEEE Aerospace Conference* (2019).

F.D. Fernandez, B.J. Steward, K.C. Gross, **M.R. Hawks**, "Implementation of a non-linear CMOS and CCD focal plane array model in ASSET", *Proceedings of the SPIE*, vol 11001 (2019).

A. Gavrialedes, L.A. Schlie, R.D. Loper, **M.R. Hawks**, G.P. Perram, "Analytic treatment of beam quality and power efficiency in high power transverse flow Diode Pumped Alkali Laser", *J. Opt. Soc. Am. B*, 35(9) (2018).

F.D. Hallada, A.L. Franz, **M.R. Hawks**, "Fresnel zone plate light field spectral imaging", *Opt Eng* 56(8) (2017).

Research Interest Areas

- Electro-optic and infrared remote sensing
- Hyperspectral imaging
- Computational physics

Dr. Darren E. Holland

PhD, Mechanical Engineering, University of Michigan

Research Assistant Professor of Engineering Physics

Most Notable Publications

Logan, J., **Holland, D.**, Burggraf, L., Clinton, J., O'Day, B. 2019. "Monte Carlo and Experimental Analysis of a Novel Directional Rotating Scatter Mask Gamma Detection System." *Nuclear Instruments and Methods in Physics Research Section A: Accelerators, Spectrometers, Detectors and Associated Equipment*. 947, pp. 162698. https://doi.org/10.1016/j.nima.2019.162698

Olesen R., O'Day B., **Holland D.**, Burggraf L., and Bevins J., 2018. "Characterization of novel rotating scatter mask designs for gamma direction identification". *Nuclear Instruments and Methods in Physics Research Section A: Accelerators, Spectrometers, Detectors and Associated Equipment.* In Press. https://doi.org/10.1016/j.nima.2018.09.067

Holland, D. E., Bevins, J. E., Burggraf, L. W., and O'Day, B. E., 2018. "Rotating scatter mask optimization for gamma source direction identification". *Nuclear Instruments and Methods in Physics Research Section A: Accelerators, Spectrometers, Detectors and Associated Equipment*. 901, pp. 104-111. https://doi.org/10.1016/j.nima.2018.05.037

Holland, D. and Epureanu, B., 2013. "A component damping identification method for mistuned blisks". *Mechanical Systems and Signal Processing.* 41 (1-2), pp. 598-612. http://dx.doi.org/10.1016/j.ymssp.2013.07.003

Holland, D. and Epureanu, B., 2012. "Hybrid modal damping identification for bladed disks and blisks". *Journal of Vibration and Control*. 20 (1), pp. 51-65. <http://dx.doi.org/10.1177/1077546312461028>

Selected Honors & Awards

Patents:
- **Holland, D.**, Olesen, R., Burggraf, L., O'Day, B., Bevins, J. 2019. "Rotating Scatter Mask Design Classes for Directional Radiation Detection and Imaging." U.S. Patent Application 62,816,435, filed March 11, 2019. Patent Pending.

- Olesen, R., Egner, B., **Holland, D.**, Martin, V., Bevins, J. 2019. "An Efficient, Dual-particle Directional Detection System using a Rotating Scatter Mask." U.S. Patent Application 62,816,451, filed March 11, 2019. Patent Pending.

Significant Accomplishments

- Member of Nuclear Event Analysis and Testing (NEAT) Center for Specialized Research (CSR)

Research Interest Areas

- Source detection and identification
- Design optimization and uncertainty analysis
- Radiation transport modeling, simulation, verification, and validation
- Machine learning techniques for imaging

Lt Col Milo W. Hyde IV

PhD, Electrical Engineering, Air Force Institute of Technology

Associate Professor of Optical Physics

Most Notable Publications

Milo W. Hyde IV, "Twisted space-frequency and space-time partially coherent beams," *Scientific Reports*, vol. 10, 12443 (12 pp.), Jul 2020, doi: 10.1038/s41598-020-68705-9.

Milo W. Hyde IV and Svetlana Avramov-Zamurovic, "Generating dark and antidark beams using the genuine cross-spectral density function criterion," *Journal of the Optical Society of America* A, vol. 36, no. 6, pp. 1058-1063, May 2019, doi: 10.1364/JOSAA.36.001058.

Milo W. Hyde IV, Santasri Bose-Pillai, David G. Voelz, and Xifeng Xiao, "Generation of vector partially coherent optical sources using phase-only spatial light modulators," *Physical Review Applied*, vol. 6, no. 6, 064030 (12 pp.), Dec 2016, doi: 10.1103/PhysRevApplied.6.064030.

Milo W. Hyde IV, Santasri R. Bose-Pillai, and Ryan A. Wood, "Synthesis of non-uniformly correlated partially coherent sources using a deformable mirror," *Applied Physics Letters*, vol. 111, no. 10, 101106 (5 pp.), Sep 2017, doi: 10.1063/1.4994669.

Milo W. Hyde IV, Santasri Basu, David G. Voelz, and Xifeng Xiao, "Experimentally generating any desired partially-coherent Schell-model source using phase-only control," *Journal of Applied Physics*, vol. 118, no. 9, 093102 (10 pp.), Sep 2015, doi: 10.1063/1.4929811.

Selected Honors & Awards

- Air Force Association Wright Memorial Chapter General Bernard A. Schriever Award

- Military Officers Association of America Outstanding Military Faculty Award

- Eta Kappa Nu (Delta Xi Chapter) Outstanding Teaching Award for Electrical and Computer Engineering

Significant Accomplishments

- OSA Senior Member

- IEEE Senior Member

- SPIE Senior Member

Research Interest Areas

- Statistical optics
- Fourier optics

- Guided wave theory
- Electromagnetic material characterization

CDR Royce W. James

PhD, Plasma Physics

AFIT Chief Diversity Officer

Visiting Professor

Most Notable Publications

M. Shilov, C. Cates, **R. James**, et al., "Dynamical plasma response of resistive wall modes to changing external magnetic perturbations," *Phys. Plasmas* 11, 2573 (2004).

M. E. Mauel, J. Bialek, A. H. Boozer, C. Cates, **R. James**, O. Katsuro-Hopkins, A. Klein, Y. Liu, D. Maurer, D. Maslovsky, G. Navratil, T. Pedersen, M. Shilov, and N. Stillitis., "Dynamics and control of resistive wall modes with magnetic feedback control coils: experiment and theory", *Phys. Plasmas* (2005).

R.W. James, E.L. Page, N. Thayer, B. Romano, D. Woodman, C. Welicka, T. Fitzgerald "Low Pressure High Density Plasma Development on a Small Helicon Plasma Experiment (HPX)," *American Physical Society's 54nd Annual Meeting of the Division of Plasma Physics*, Providence, RI; November, 16, 2012.

R.W. James, "Progress on Development of Low Pressure High Density Plasmas on the Helicon Plasma Experiment (HPX)," *American Physical Society's 61st Annual Meeting of the Division of Plasma Physics*, Fort Lauderdale, FL; November, 5 - October, 24, (2019).

Freeman, **R.W, James**, R.W., Allen, L.A., Tejero, E., Daeffler, M. "CGA/NRL Impedance Probe as a ThinSat Spacecraft Payload" *American Physical Society's 61st Annual Meeting of the Division of Plasma Physics*, Fort Lauderdale, FL; November, 5 - October, 24, (2019).

Selected Honors & Awards

- Coast Guard Meritorious Service Medal
- Black Engineer of the Year Award (BEYA): Professional Achievement Award
- US Coast Guard Academy's Center for Academic Studies Summer Fellowship Award
- Coast Guard Commendation Medal
- Coast Guard Representative for National Aeronautics and Space Administration Astronaut Selection Process
- US Coast Guard Permanent Commissioned Teaching Staff (military version of Tenured Professor) sworn in – selected in 2005

Significant Accomplishments

- Air Force Institute of Technology Visiting Faculty Fellow
- Unitarian Universalist Association President's International Award for Volunteer Service
- Special Congressional Recognition for Volunteer Service to Children and Families
- US Coast Guard Academy's Ms. Frances Neal Humanitarian Award
- Columbia University Research Fellow

Research Interest Areas

- Laboratory and Space based Magnetized Plasmas
- Plasma Interactions with Electromagnetic Radiation (with emphasis on high energy lasers)
- Fusion Energy
- Plasma Water Treatment
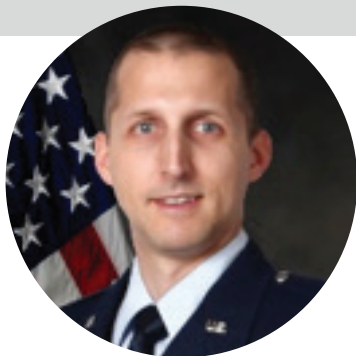
Lt Col Christopher A. Lenyk

PhD, Air Force Institute of Technology

Assistant Professor of Nuclear Engineering

Most Notable Publications

C. A. Lenyk, N. C. Giles, E. M. Scherrer, B. E. Kananen, L. E. Halliburton, K. T. Stevens, G. K. Foundos, J. D. Blevins, D. L. Dorsey, S. Mou, "Ir4+ ions in ⊡-Ga2O3: an unintentional deep donor," *J. Appl. Phys.* 125, 045703 (2019).

C. A. Lenyk, M. S. Holston, B. E. Kananen, L. E. Halliburton, N. C. Giles, "Lithium and gallium vacancies in LiGaO2 crystals," *J. Appl. Phys.* 124, 135702 (2018).

T. E. R. Dodson, L. E. Halliburton, G. S. Kedziora, **C. A. Lenyk**, N. C. Giles, "Self-trapped holes (small polarons) in ferroelectric KH2PO4 crystals," *J. Phys.*: Condens. Matter 31, 505503 (2019).

C. A. Lenyk, D. J. Bunker, J. W. McClory, S. R. McHale, B. R. Kowash, "Defining a Methodology for Data Analysis Using Streak Films," *Journal of Radiation Effects*, Research and Engineering, 33, 1-E, (2015).

Research Interest Areas

- Isolated point defects in single crystals
- Electron paramagnetic resonance (EPR)
- Thermoluminescence (TL)
- Photoluminescence (PL)
- Fourier-transform infrared (FTIR) spectroscopy
- Ultra-wide-bandgap oxides
- Scintillators
- Optical materails
- Radiation effects on materials
- Nuclear weapon effects

Dr. Juan Jose Manfredi, Jr.

PhD, Physics, Michigan State University

Assistant Professor of Nuclear Engineering

Most Notable Publications

J. Manfredi, J. Lee, A.M. Rogers, et al., "Quenching of single-particle strengths in direct reactions," *Phys. Rev.* C, 104, 024608, 2021.

T. A. Laplace, B. L. Goldblum, **J. J. Manfredi**, J. A. Brown, D. L. Bleuel, C. A. Brand, G. Gabella, J. Gordon, and E. Brubaker, "Simultaneous measurement of organic scintillator response to carbon and proton recoils," *Phys. Rev.* C, 104, 014609, 2021.

J. J. Manfredi, B. L. Goldblum, T. A. Laplace, et al., "Proton light yield of fast plastic scintillators for neutron imaging," *IEEE Transactions on Nuclear Science*, vol. 67, no. 2, pp. 434–442, 2020.

J. Manfredi, J. Lee, W. Lynch, et al., "On determining dead layer and detector thicknesses for a position sensitive silicon detector," *Nucl. Inst. and Meth.* A, vol. 888, pp. 177 – 183, 2018.

J. Manfredi, R. J. Charity, K. Mercurio, et al., "Alpha decay of the excited states in 12C at 7.65 and 9.64 MeV," *Phys. Rev.* C, 85, 037603, 2012.

Selected Honors & Awards

- Nuclear Science and Security Consortium Postdoctoral Fellow (2020-2021)
- NNSA Stewardship Science Graduate Fellowship (2013-2017)
- National Superconducting Cyclotron Laboratory Fellowship (2012-2017)

Significant Accomplishments

- AFIT Point of Contact for the Nuclear Science and Security Consortium
- Member of review panels for programs at the Department of Energy Office of Defense Nuclear Nonproliferation and Office of Nuclear Physics
- Mentorship of graduate students

Research Interest Areas

- Radiation detector development, characterization, and application
- Nuclear physics
- Modeling and simulation of nuclear processes
- Natural language processing and machine learning

Dr. Michael A. Marciniak

PhD, Engineering Physics, Air Force Institute of Technology

Professor of Physics

Most Notable Publications

B. Adomanis, D.B. Burckel and **M. Marciniak**, "3D plasmonic design approach for efficient transmissive Huygens metasurfaces," *Optics Express* 27(15), 20928-20937 (Jul 2019).

G.E. Lott, **M.A. Marciniak** and J.H. Burke, "Three Dimensional Imaging of Trapped Cold Atoms with a Light Field Microscope," *Applied Optics* Vol. 56, No. 31, pp. 8738-8745 (Oct 2017).

J.C. Vap, S.E. Nauyoks, M.R. Benson and **M.A. Marciniak**, "Use of a novel infrared wavelength-tunable Mueller-matrix polarimeteric scatterometer to measure nanostructured optical materials," *Review of Scientific Instruments* Vol. 88, pp. 103104(1-6) (Oct 2017).

S.D. Butler, S.E. Nauyoks and **M.A. Marciniak**, "Comparison of micro-facet BRDF model to modified Beckmann-Kirchhoff BRDF model for rough and smooth surfaces," *Optics Express* Vol. 23, No. 22, pp. 29100-29112 (Nov 2015).

M.R. Benson, A.G. Kinsley, **M.A. Marciniak**, M.D. Seal and A.M. Urbas, "Permittivity and permeability tensor extraction technique for arbitrary anisotropic materials," M.R. Benson,* *IEEE Photonics Journal* Vol. 7, No. 3, pp. 2600613(1-13) (Jun 2015).

Selected Honors & Awards

- 2009 Wright Memorial Chapter, Air Force Association, Col Gage H. Crocker Outstanding Professor Award (1 Jan-31 Dec 2008)

Significant Accomplishments

- "Remote sensing of hidden objects," M.G. Hoelscher and M.A. Marciniak, US Patent No. 8,976,256 B2, 10 March 2015.

Research Interest Areas

- Light-matter interaction, including polarimetric scatterometry of nanostructured materials (photonic crystals, plasmonic materials and optical meta-materials)
- Bidirectional reflectance distribution functions (BRDF) for optical signatures
- High-energy-laser damage assessment

Dr. John W. McClory

PhD, Nuclear Engineering, Air Force Institute of Technology

Professor of Nuclear Engineering

Most Notable Publications

James J. Frey, Richard G. Cobb, and **John W. McClory**, "Modeling a Lossy Dieletric Polymer-Based Thermoacoustic High Power Microwave Directed Energy Exposure Detection System", published online in the *Health Physics*, April 2022. https://doi.org/10.1097/HP.0000000000001559

J. Seik, B.J. Borghetti, **J.W. McClory**, A.A. Bickley, A. Holland, "Application of an Artificial Neural Network to Assay Data for Nuclear Forensics Analysis," *Journal of Radiation Effects, Research and Engineering*, vol. 40, no. 1, pp. 93-100, March 2022.

Zachary W. LaMere, Darren E. Holland, Whitman T. Dailey, and **John W. McClory**, "Space to Air High-Altitude Region Adjoint Neutron Transport," published online in the *Journal of Defense Modeling and Simulation*, July 2021. https://doi.org/10.1177/15485129211031669

Lei Pan, Praneeth Kandlakunta, Matthew Van Zile, Xuezeng Dai, Jinsong Huang, **John W. McClory**, and Lei R. Cao, "Acquiring and Modeling of Si Solar-Cell Transient Response to Pulsed X-Ray," *IEEE-Transactions on Nuclear Science*, vol. 68, no. 5, pp. 1152-1160, May 2021. http://dx.doi.org/10.1109/TNS.2021.3067193

N. Gale, **J.W. McClory**, M. Hogsed, and B. Wang, "Neutron Displacement Damage in Germanium-Tin Photodiodes," *Journal of Radiation Effects, Research and Engineering*, vol. 39, no. 1, pp. 116-123, April 2021.

Selected Honors & Awards

- Dean's Distinguised Teaching Professor Award (2019)

- AETC Nuclear Deterrence Operations Professional Team of the Year Award (2019)

Significant Accomplishments

- Nuclear Engineering Program Curriculum Chair (2018-present)

- Member Joint National Security Applications Council-Peer Review Panel (JNSAC-PRP) (2013-present)

- Director, Nuclear Weapons Effects, Policy, and Proliferation Graduate Certificate Program (2013-present)

- AFTAC Endowed Term Chair Professor for Materials

Research Interest Areas

- Radiation effects
- Radiation detector development
- Nuclear weapon effects
- Nuclear forensics techniques

Dr. Jack E. McCrae

PhD, Physics, Air Force Institute of Technology

Research Assistant Professor of Physics

Most Notable Publications

Noah R. Van Zandt, **Jack E. McCrae**, and Steven T. Fiorino, "Modeled and measured image-plane polychromatic speckle contrast," *Opt. Eng.* 55 (2):024106 (1-7), (Feb 2016).

Santasri Basu, **Jack E. McCrae**, Steven Fiorino, and Jared Przelomski, "Estimation of temporal variations in path-averaged atmospheric refractive index gradient from time-lapse imagery," *Submitted to Optical Engineering Letters*.

Basu, Santasri, **J.E. McCrae**, and S.T. Fiorino, "Estimation of atmospheric refractive index gradient variations and Cn2 from time-lapse imagery," *Propagation through and Characterization of Atmospheric and Oceanic Phenomena (pcAOP), Imaging and Applied Optics Conference*, Arlington VA, 27-29 June 2016.

Jack E. McCrae, Santasri Basu, and Steven T. Fiorino, "Estimation of atmospheric parameters from time-lapse imagery," *Proc. SPIE 9833,* Atmospheric Propagation XIII, 983303 (May 13, 2016) doi:10.1117/12.2223986.

McCrae, J.E. and S.T. Fiorino, "Simulation of Array Tilt Effects in Laser Phased Arrays," *2016 IEEE Aerospace Conference* Big Sky, Montana. 5-12 March 2016.

Research Interest Areas

- Optics
- Lasers
- Quantum and non-linear optics
- Quantum computing
- Laser radar
- Modeling and measurements of atmospheric propagation, and imaging

Dr. Michael V. Pak

PhD, Theoretical Physics, St. Petersburg State University

PhD, Quantum Chemistry, Iowa State University

Research Assistant Professor of Physics

Most Notable Publications

Yang Yang, K.R. Brorsen, T. Culpitt, **Michael V. Pak**, S. Hammes-Schiffer "Development of a Practical Multicomponent Density Functional for Electron-Proton Correlation to Produce Accurate Proton Densities", *J. Chem. Phys.*, 147, 114113 (2017)

K.R. Brorsen, **Michael V.Pak**, S. Hammes-Schiffer "Calculation of positron binding energies and electron–positron annihilation rates for atomic systems with the reduced explicitly correlated Hartree–Fock method in the Nuclear–Electronic Orbital framework", *J. Phys. Chem.* A, 121 (2), pp 515–522 (2017)

A. Chakraborty, **Michael V.Pak**, S. Hammes-Schiffer "Development of electron-proton density functionals for multicomponent density functional theory", *Phys. Rev. Lett.*, 101, 153001 (2008)

Michael V. Pak, M.S. Gordon, "Hyperfine coupling tensors for multi-configurational quasi-degenerate perturbation theory (MCQDPT)", *J. Chem. Phys.*, 118 (1) (2003)

A.V. Tulub, V.F. Brattsev, **Michael V. Pak**, "Electron density in the interior of nuclei with allowance for QED effects in the many-electron theory of atoms", *Phys. Atom. Nuc.*, 61 (4), pp.520-524

Research Interest Areas

- Theory of quantization, topological quantum computing and quantum theory of multi-component systems.
- Development of new methods to accurately describe matter-antimatter interactions, and specifically positron annihilation in complex multi-electron environment.
- Physics of nuclear beta decay in intense radiation field.

Dr. Anil K. Patnaik

PhD, Quantum Optics, Physical Research Laboratory (India)

Associate Professor of Physics

Most Notable Publications

"Investigating chemometric methods to improve the limit of detection for trace elements in plutonium via a handheld laser-induced breakdown spectroscopy device," Ashwin P. Rao, Phillip R. Jenkins, Dung M. Vu, John D. Auxier II, **Anil K. Patnaik**, Michael B. Shattan, *Analytical Methods* 13, 3368-3378 (2021).

"Influence of Coherent Population Trapping on Raman Scattering," Puja Singh, **Anil K. Patnaik**, Sukesh Roy, James R. Gord, and Yuri V. Rostovtsev, *Phys. Rev.* A 100, 023808 (2019).

"Recent advances in ultrafast-laser-based spectroscopy and imaging for reacting plasmas and flames," **Anil K. Patnaik**, Igor Adamovich, James R. Gord, and Sukesh Roy, *Plasma Sources Science and Technology* 26, 103001 (2017).

"All-optically controlled concurrent slow-fast light," **Anil K. Patnaik**, Sukesh Roy, and James R. Gord, *Optics Letters* 36, 3272-3274 (2011).

"A simple study of photon correlations from Hanbury-Brown and Twiss to Einstein," Podolsky, Rosen and beyond, Roy J. Glauber, Manfred Kleber, **Anil K. Patnaik**, Marlan O. Scully, and Herbert Walther, *Journal of Physics* B 38, S521-S534 (2005).

Selected Honors & Awards

- AFIT Dean's Distinguished Teaching Professor Award 2021

- Research work in international news [Physics World, 2015]

- Japanese Society for Promotion of Science (JSPS) fellowship for the period 2001-2003, with a research grant

Significant Accomplishments

- Highly cited papers with ~ 1350 citations; h-index 18, i10-index 31 (Source: Google Scholar)

- Serving as Program Chair in Optical Society of America (OSA) conference on Laser Applications in Chemical, Security and Environmental Analysis

- Plenary speaker and organizer of a technical session at 51st Winter Colloquium on the Physics of Quantum Electronics 2022

Research Interest Areas

- Quantum optics and information
- Extreme light-matter interactions for
- Laser spectroscopic applications for nuclear diagnostics

Dr. Glen P. Perram

PhD, Physics, Air Force Institute of Technology

Professor of Physics

Most Notable Publications

N.D. Haluska, **G. P. Perram**, and Christopher A. Rice, "Efficient cascade lasing on over 17 wavelengths from two-photon excitation of cesium 6^2D," *Optics Communications*, 476, 126328, August 2020.

Douglas E. Thornton, Mark F. Spencer, Christopher A. Rice, and **Glen P. Perram** "Impacts of Laboratory Vibrations and Laser Flicker Noise on Digital Holography," *IEEE Journal of Quantum Electronics*, 56, 1400107, Oct 2020.

T.A. Van Woerkom, **G.P. Perram**, B.D. Dolasinski, P.A. Berry, and C.D. Phelps, "Laser ablation of metals and semiconductors with 100 ps - 100 µs pulses," *Optical Engineering*, 58, 08611, August 2019

Ashley E. Gonzales, Nicholas C. Herr, and **Glen P. Perram**, "Experimental Study of Laser Irradiated Graphite Oxidation using IFTS," *Combustion and Flame*, 192, 180-189, Mar 2018.

Athanasios Gavrielides, L.A. (Vern) Schlie, Robert D. Loper, Michael R. Hawks, and **Glen P. Perram**, "Analytic treatment of beam quality and power efficiency in high power transverse flow Diode Pumped Alkali Laser," *J Optical Society of America B*, 35, 2202-2210, Sep 2018.

Selected Honors & Awards

- Air Force Science, Technology and Mathematics Award, Outstanding Senior Civilian Scientist

- Air Force Science and Engineering, Exploratory Team Award

Significant Accomplishments

- Fellow, Optical Society of America

- Fellow, Directed Energy Professional Society

Research Interest Areas

- Lasers devices
- Laser weapons
- Spectroscopy

- Chemical kinetics
- Remote sensing

Dr. James C. Petrosky

PhD, Engineering Physics, Rensselaer Polytechnic Institute

Professor of Nuclear Engineering

Most Notable Publications

Nichole Benker, Elena Echeverria-Mora, Jennifer Hamblin, Peter A. Dowben, Axel Enders, Brant Kananen, **James Petrosky**, John McClory. "Possible detection of solar neutrons from the ISS." *American Astronomical Society Meeting Abstracts*, 232 (2018).

Christina L. Dugan, George Glenn Peterson, Alyssa Mock, Christopher Young, J. Matthew Mann, Michael Nastasi, Mathias Schubert, Lu Wang, Wia-Ning Mei, Lori Tanabe, Peter A. Dowben, **James Petrosky**. "Electrical and material properties of hydrothermally grown single crystal (111) UO2." *The European Physical Journal* B 91:67, April, 2018.

J. R. Fee Jr. and **J. C. Petrosky**, "Validation of the Air Burst EMP Simulation Capability, B-code," *Journal of Rad Effects, Res, and Eng*. Vol 35 (SECRET), April, 2018.

David Smith, *Bertus Shelters, Derek Hesser, Peter Collins, James Fee, **James Petrosky**, Andrew Terzuoli, Caglar Yadim. "Effects of inonospheric scintillation on V and W band signals," *2017 IEEE International Symposium on Antennas and Propagation & USNC/URSI Radio Science Meeting*, 9-14 July 2017.

Christopher Young, **James Petrosky**, J. Matthew Mann, Eric M. Hunt, David Turner and Peter A. Dowben, "The lattice stiffening transition in UO2 single crystals," *Journal of Physics: Condensed Matter*, 29 (2017), 21 November 2016.

Selected Honors & Awards

- Charles Stone Award
- Aldren Research Excellence Award
- AETC Science and Technology Professor of the Year Award
- General Bernard Schriever Award
- Member of the AETC Nuclear Deterrence Operations Professional Team of the Year

Significant Accomplishments

- NNSA Review Committee Member of the following: Radiation Effects and High Energy Density Sciences (REHEDS) research consortium, Qualification Alternatives to the Sandia Pulsed Reactor (QASPR) and the Radiation-aware Electrical Multi-Scale Model Based Design (REMS-MDB) L2 review team

Research Interest Areas

- Radiation effects on electronic devices, EMP, experimental design, radiation detection, and nuclear weapon effects.
- Narrow- and wide-band gap materials, using combinations of electrical, optical, and absorption spectroscopy to gain information on the damaging effects of ionizing and non-ionizing radiation.

Dr. Heidi R. Ries

PhD, Applied Physics, Old Dominion University

Provost and Chief Academic Officer

Professor of Physics

Most Notable Publications

"Microwave response near zero magnetic field in transition-metal-doped silicate glasses," R.R. Rakhimov, **H.R. Ries**, D.E. Jones*, L.B. Glebov, and L.N. Glebova. *Appl. Phys. Lett.* 76 (6) pp. 751-753 (2000).

"Spin dynamics of the triplet Cr4+ in the vicinity of energy level anti-crossing," R. R. Rakhimov, H. R. Horton*, D. E. Jones*, G. B. Loutts, and **H. R. Ries**. *Chem. Phys. Lett.* (319) 5-6 (2000) pp. 639-644

"Manganese-doped yttrium orthoaluminate: A potential material for holographic recording and data storage," G.B. Loutts, M. Warren*, L. Taylor*, R.R. Rakhimov, **H.R. Ries**, G. Miller, III; M.A. Noginov, M. Curley, N. Noginova, N. Kukhtarev, H.J. Caulfield, P. Venkateswarlu. *Phys. Rev.* B 57 (7) 3706-3709 (1998)

"Crystal growth, spectroscopic characterization, and laser performance of a new efficient laser material Nd:Ba5(PO4)3F," G.B. Loutts, C. Bonner, C. Meegoda*, **H. Ries**, M.A. Noginov, N. Noginova, M. Curley, P. Venkateswarlu, A. Rapaport, and M. Bass, Applied Physics Letters 71(3) 303 (1997) (selected for inclusion in the *SPIE's Milestone Series of Selected Reprints on the subject Laser Crystal Growth*, Robert Uhrin, editor).

"Mechanism of Electrical Conductivity in an Irradiated Polyimide," **H.R. Ries**, W.L. Harries, S.A.T. Long, and E.R. Long, Jr., *J. Phys. Chem. of Solids* 50, 735 (1989).

Selected Honors & Awards

• Air Force Exemplary Civilian Service Award (2013)

• Air Force winner of the 2011 Department of Defense Women's History Month Science, Technology, Engineering and Mathematics Role Model Award, Civilian category

• Air Force winner of the 2011 National Latina Distinguished Service Award

• Ten Top Women Award (Dayton Daily News, 2009)

• Air Force Meritorious Civilian Service Award (2008)

Significant Accomplishments

• Higher Learning Commission Team Chair and Peer Reviewer

• Chair, Board of Trustees, Engineering and Science Foundation of Dayton

Research Interest Areas

• Radiation effects
• Nonlinear optical materials
• Electron paramagnetic resonance spectroscopy
• Laser processing of materials

Dr. Adib J. Samin

PhD, Mechanical Engineering, The Ohio State University

Assistant Professor of Nuclear Engineering

Most Notable Publications

Samin, A.J., Andersson, D. A., Holby, E. H., and Uberuaga, B. P. Ab initio based examination of the kinetics and thermodynamics of oxygen in Fe-Cr alloys, *Physical Review B.* 99 (2019) 174202.

Samin, A. J., Andersson, D.A., Holby, E. H., and Uberuaga, B. P. First-principles localized cluster expansion study of the kinetics of hydrogen diffusion in homogeneous and heterogeneous Fe-Cr alloys, *Physical Review B.* 99 (2019) 014110.

Samin, A. J., Holby, E. F. Andersson, D. and Uberuaga, B. P. On the role of electro-migration in the evolution of radiation damage in nanostructured ionic materials. *Electrochemistry Communications*, 2018. 96: p. 47-52.

Samin, A. J. and C.D. Taylor, A one-dimensional time-dependent model for studying oxide film growth on metallic surfaces. *Journal of Applied Physics*, 2018. 123(24): p. 245303.

Samin, A. J. and Taylor, C. A. First-principles investigation of surface properties and adsorption of oxygen on Ni-22Cr and the role of molybdenum. *Corrosion Science*, 2018. 134: 103-111.

Selected Honors & Awards

- 2018 Director's Postdoctoral Fellowship at the Los Alamos National Laboratory (LANL).

- 2010 Distinguished University Fellowship for graduate students – The Ohio State University

Significant Accomplishments

- 2007 Physical Chemistry Undergraduate Award – Wayne State Department of Chemistry

Research Interest Areas

- Modeling and simulation of corrosion
- Defect transport
- Electrochemical phenomena
- Radiation damage

Maj Peter A. Saunders

PhD, Atmospheric Science, University of Utah

Academic Advisor, Atmospheric Science Program

Assistant Professor of Atmospheric Science

Most Notable Publications

Saunders, Peter, Yafan Yu, and Zhaoxia Pu. "Sensitivity of numerical simulations of hurricane Joaquin (2015) to cumulus parameterization schemes: Implications for processes controlling a hairpin turn in the track." *Journal of the Meteorological Society of Japan*. Ser. II (2019).

Selected Honors & Awards

- GSEM CGO of the Year, 2020

- Air Force Commendation Medal, 2 OLC
- AFMC CGO of the Year, 2015

- Weather Officer Course Distinguished Graduate, 2011

Significant Accomplishments

- Lead for AFIT Facilitator Cadre

- Forward deployed to Korea, 2013-2014

Research Interest Areas

- Tropical cyclone rainfall
- Lightning analysis and modeling
- Machine-learning-based image classification
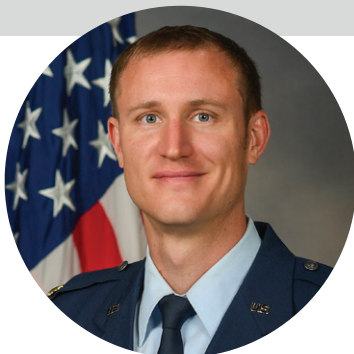
Maj Todd V. Small

PhD, Applied Physics, University of Tennessee

Assistant Professor of Physics

Most Notable Publications

Small, Todd V., Samuel D. Butler, and Michael A. Marciniak, "Augmenting CASI BRDF measurement device to measure out-of-plane scatter with CCD pixel array," *Proc. SPIE* 11485, 114850B (2020).

Small, Todd V., Samuel D. Butler, and Michael A. Marciniak, "Scatter Coordinate mapping and out-of-plane BRDF measurements for specular materials using an augmented CASI measurement system," *Proc. SPIE* 11727, 117270X (2021).

Werkley, Anne W., Samuel D. Butler, **Todd V. Small**, Michael A. Marciniak, "Data-driven algorithm to classify the degree of isotropy in the bidirectional reflectance distribution function," *Opt. Eng*. 60(9), 094108 (2021), DOI: 10.1117/1. OE.60.9.094108.

Small, Todd V., Samuel D. Butler, and Michael A. Marciniak, "Uncertainty Analysis for CCD-Augmented CASI BRDF Measurement System," *Accepted by Opt. Eng*. on 12 Oct 2021.

Small, Todd V., Samuel D. Butler, and Michael A. Marciniak, "Solar Cell BRDF Measurement and Modeling with Out-of-Plane Data," *Accepted by Opt. Express* on 5 Oct 2021.

Selected Honors & Awards

- Meritorious Service Medal

- Air Medal with 7 Oak Leaf Clusters

- Joint Service Commendation Medal

- Air Force Commendation Medal

- Afghanistan Campaign Medal with 2 devices

Significant Accomplishments

- Four Deployments in support of the Global War on Terrorism

- U-28A Pilot with 915 Combat Flight Hours / 186 Combat Sorties

Research Interest Areas

- Optical Scatter
- Remote Sensing

- Optical Properties of Materials
- Space Domain Awareness

Dr. Bryan J. Steward

PhD, Optical Sciences & Engineering, Air Force Institute of Technology

Research Assistant Professor of Optical Engineering

Technical Advisor, Center for Technical Intelligence Studies & Research

Most Notable Publications

Fernandez, Fernando D., **Steward, Bryan J.**, Hawks, Michael R. and Gross, Kevin C. (15 April 2019), "Implementation of a non-linear CMOS and CCD focal plane array model in ASSET," *Proceedings of SPIE*. 11001, 11001-10.

Schwaab, Matthew J., Greendyke, Robert and **Steward, Bryan J.** (9 July 2017), "Arrhenius Rate Chemistry-Informed Inter-Phase Source Terms (ARCIIST)," *20th Biennial Conference of the APS Topical Group on Shock Compression of Condensed Matter*, St. Louis, MO, Vol. 62, No. 9.

Young, Shannon R., **Steward, Bryan J.**, and Gross, Kevin C. (11 April 2017), "Development and Validation of the AFIT Sensor Simulator for Evaluation and Testing (ASSET)," *Proceedings of SPIE*. 10178, 101780A.

Steward, Bryan J. and Hawks, Michael R (2016), "End-to-End Model Enhancements and Hypothetical Detection Scenarios," Air Force Institute of Technology, DTIC No. AD1020340.

Young, Shannon R., **Steward, Bryan J.**, Hawks, Michael R., and Gross, Kevin C. (17 May 2016), "Improving Detection of Low SNR Targets Using Moment-based Detection," *Proceedings of SPIE*. 9828, 98280K.

Selected Honors & Awards

- Civilian of the Quarter: Persistent Infrared Squadron (NASIC), Category III (2013 & 2015)

- Civilian of the Quarter: GEOINT/MASINT Squadron (NASIC), Category II (Spring 2010)

- U.S. Force Science, Technology, and Engineering – Team Scientist Award (Aug 2010)

- Civilian of the Quarter: Wright Patterson Air Force Base, Category I (Fall 2006)

Significant Accomplishments

- Air Force Institute of Technology MS Applied Physics Distinguished Graduate (2006)

- National Defense Science and Engineering Graduate Fellow (Sep 2004 – Aug 2007)

Research Interest Areas

- EO/IR Remote Sensing
- Radiometric Sensor and Scene Modeling
- Signal and Image Processing Algorithm Development

- Overhead Persistent Infrared (OPIR)
- On-Orbit Sensor Characterization
- Machine Learning

ENP

Dr. Gaiven Varshney

PhD, Applied Chemistry, Z. H. College of Engineering and Technology, AMU, India

Research Assistant Professor of Nuclear Engineering

Most Notable Publications

G. Daniel, **G. Varshney**, A. Holland, J. McClory and A. Bickley, "A Machine Learning Approach to Characterizing Particle Morphology in Nuclear Forensics," Journal of Radiation Effects, *Research and Engineering*, Vol 39, 141-148, 2021.

J. Cezeaux, **G. Varshney**, A. Bickley and J. C. Petrosky "Morphological Classification and Analysis of Fuel Bearing Debris from a Non-Critical Event," *Journal of Radiation Effects, Research and Engineering*, Vol 38, Issue 1, 2020. (S//RD)

G. Varshney, J. Cezeaux, and J.C. Petrosky. Investigation of "Fissile Materials Collected from a Non-Critical Nuclear Explosion Site using Non-destructive Analytical Techniques," *Journal of Radioanalytical and Nuclear Chemistry*, 2018, 318 (1) 505-513.

G. Varshney, D.M. Kempisty, S.R. Kanel, E.S. Demessie, R.S. Varma, M. Nadagouda, A. Agrawal, and V. Varshney. A Nanoscale "TiO2 films and their Application in Remediation of Organic Pollutants," *Coordination Chemistry Reviews*, 2016, 306, 43-64.

G. Varshney, H. S. Rathore, S. C. Mojumdar and M. T Saleh. "Synthesis, Characterization and Fungicidal Activity of Zinc diethyldithiocarbamate and Phosphate," *Journal of Thermal Analysis and Calorimetry*, 2007, 90 (3) 681.

Selected Honors & Awards

- 2021 Society of Asian Scientists and Engineers (SASE) Promising Professional Award. Recognized in SASE's magazine and website (2021)

- Recognized by Defense Threat Reduction Agency (DTRA)/Nuclear Science Engineering Research Center (NSERC) (2020)

- Graduate School 3rd Quarter CY20 Countering Weapons of Mass Destruction Team award (2020)

- AETC Nuclear Deterrence Operations Professional Team of the Year Award (2019)

Significant Accomplishments

- Co-Chair, Countering Weapons of Mass Destruction Graduate Certificate Program (2020-Present)

- Member, Nuclear Expertise for Advancing Technologies Center (2019-Present)

Research Interest Areas

- Radiation detection
- Investigation of post-detonation debris using various microscopic and spectroscopic characterization techniques

- Characterization of semiconductors and nanomaterials
- Wastewater treatment
- Environmental remediation

Dr. David E. Weeks

PhD, Physics, University of Arkansas

Professor of Physics

Most Notable Publications

A.R. Sharma and **D.E. Weeks**, "Interatomic Potentials for Ground and Excited States of Ar + He," *J. Chem. Phys.* 149 (2018) 194302.

A.R. Sharma and **D.E. Weeks**, "Excited Interatomic Potential Energy Surfaces of Rb + He that Correlate with Rb Terms 52S through 72S," *Phys. Chem. Chem. Phys.* 20 (2018) 29274-29284.

L.A. Blank, A.R. Sharma, and **D.E.Weeks**, "Influence of Basis-Set Size on the X 2S1/2, A 2P1/2, A 2P3/2, and B 2S1/2 Potential-Energy Curves, A2P3/2 Vibrational Energies, and D1 and D2 Line Shapes of Rb+He," *Phys. Rev. A*, 97 (2018) 032705.

D.J. Emmons, **D.E. Weeks**, B. Eshel, and G.P. Perram, "Metastable Ar(1s5) Density Dependence on Pressure and Argon-Helium mixture in a High Pressure Radio Frequency Dielectric Barrier Discharge," *J. Appl. Phys.*, 123 (2018) 043304.

C.D. Lewis and **D.E. Weeks**, "Theoretical Cross Sections of the Inelastic Fine Structure Transition M(2P1/2) + Ng ⮕ M(2P3/2) + Ng for M = K, Rb, and Cs, and Ng = He, Ne, and Ar," *J. Phys. Chem. A*, 121 (2017) 3351.

Research Interest Areas

- Atomic and Molecular Physics
- Laser Modeling and Simulation
- Quantum Information

- Computer Graphics
- Mathematical Physics
- Condensed Matter Physics

Dr. Paul J. Wolf

PhD, Physics, Air Force Institute of Technology

Associate Dean for Academic Affairs

Professor of Physics

Most Notable Publications

P.J. Wolf, "The Plasma Properties of Laser Ablated SiO2," *J. Appl. Phys.* 72, 1280 (1992).

J.J. Kester, **P.J. Wolf**, and W.R. White, "Second Harmonic Generation in Planar Waveguides of Doped Silica," *Opt. Lett*. 17, 1779 (1992).

P.J. Wolf, "Investigations on the Expansion Dynamics of Ge Atoms Produced from Laser-Ablated GeO2," *Applied Physics* A, 62, 553 (1996).

R.S. Pope, **P.J. Wolf**, and G.P. Perram, "Line Broadening in the A-band of O2 by Molecular Perturbers," *J. Quant. Spectrosc. Radiat. Transfer*, 64, 363 (2000).

R.S. Pope and **P.J. Wolf**, "Noble Gas Broadening of the Fundamental Band of Nitric Oxide," *J. Mol. Spectrosc.*, Sept 2001.

J. Holtgrave and P.J. Wolf, "Pressure broadening and line shifting of atomic strontium 5s2 1S0 → 5s5p 3P1 and 5s5p 3P0,1,2 → 5s6s 3S1 absorption transitions induced by noble-gas collisions," *Phys. Rev A*, 72, 012711 (2005).

Significant Accomplishments

- Higher Learning Commission Peer Reviewer

Research Interest Areas

- Atomic and molecular spectroscopy
- Foundations of quantum mechanics
- Philosophy of science
- Existential-threat analyses
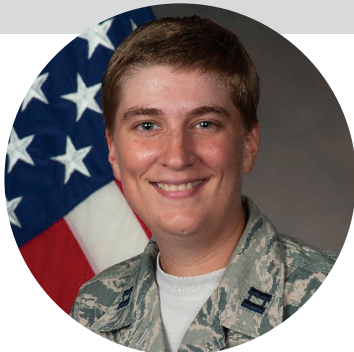
Capt Shannon R. Young

PhD, Applied Physics, Air Force Institute of Technology

Assistant Professor of Physics

Most Notable Publications

Young, Shannon R., Steward, Bryan J., and Gross, Kevin C. (11 April 2017), "Development and Validation of the AFIT Sensor Simulator for Evaluation and Testing (ASSET)," *Proceedings of SPIE*. 10178, 101780A.

Young, Shannon R., Steward, Bryan J., Hawks, Michael R., and Gross, Kevin C. (17 May 2016), "Improving Detection of Low SNR Targets Using Moment-based Detection," *Proceedings of SPIE*. 9828, 98280K.

Roger D. Tippets, Stephen Wakefield, **Shannon Young**, Ian Ferguson, Christopher Earp-Pitkins, Francis K. Chun, "Slitless spectroscopy of geosynchronous satellites," *Opt. Eng.* 54(10) 104103 (9 October 2015) https://doi.org/10.1117/1.OE.54.10.104103.

Selected Honors & Awards

- Company Grade Officer of the Quarter, Air Force Research Lab, Multispectral sensing & detection division (AFRL/RYM), Fall 2013 & Spring 2014

- Company Grade Officer of the Quarter, Air Force Research Lab (AFRL), Fall 2020

Research Interest Areas

- EO/IR Remote Sensing
- Radiometric Sensor and Scene Modeling
- Signal and Image Processing Algorithm Development

- Edge processing Algorithm Development
- Overhead Persistent Infrared (OPIR)
- Machine Learning

Dr. Alan V. Lair

PhD, Mathematics, Texas Tech University

Department Head, Mathematics and Statistics

Most Notable Publications

A. V. Lair and A. W. Shaker, "Classical and weak solutions of a singular semilinear elliptic problem", *Journal of Mathematical Analysis and Applications* 211 (1997), 371-385.

A. V. Lair, "A necessary and sufficient condition for existence of large solutions to semilinear elliptic equations", *Journal of Mathematical Analysis and Applications* 240 (1999), 205-218.

A. V. Lair and A. W. Wood, "Existence of entire large positive solutions of semilinear elliptic systems", *Journal of Differential Equations* 164 (2000), 380-394.

A. V. Lair, "Entire large solutions to semilinear elliptic systems", *Journal of Mathematical Analysis and Applications* 382 (2011), 324-333.

A. V. Lair and A. Mohammed, "Entire large solutions to elliptic equations of power non-linearities with variable exponents", *Advanced Nonlinear Studies* 13 (2013), 699-719.

Research Interest Areas

- Nonlinear Diffusion
- Boundary Blowup Solutions of Semilinear Elliptic Equations
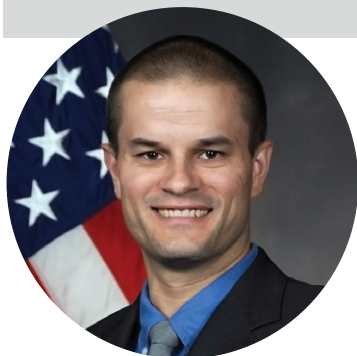
Dr. Benjamin F. Akers

PhD, Mathematics, University of Wisconsin-Madison

Professor of Mathematics

Most Notable Publications

B.F. Akers and J.A. Reeger, "Numerical Simulation of Thermal Blooming with Laser-Induced Convection", *J. Electromagnetic Waves and Applications*. 33(1), 96-106, (2019).

B. F. Akers, "Modulational instabilities of periodic traveling waves in deep water," *Physica D: Nonlinear Phenomena*, 300, 26-33, (2015).

B. Akers, D.M. Ambrose and J.D. Wright, "Gravity Perturbed Crapper Waves," *Proc. of the Roy. Soc.* A., 470, 2161, (2014).

B. Akers and Wenxuan Gao, "Wilton ripples in weakly nonlinear model equations," *Commun. Math. Sci.*, 10(3), 1015-1024, (2012).

B. Akers and P.A. Milewski, "A model equation for wavepacket solitary waves arising from capillary-gravity flows," *Stud. Appl. Math.*, 122, 249-274, (2009).

Selected Honors & Awards

- AFIT Dean's Distinguished Teaching Professorship (Schoolwide): 2020

- AFOSR Visiting Scientist Program: 2019

- AFIT-ENC Instructor of the Year (Departmental): 2018

- AFIT-ENC Instructor of the Quarter (Departmental): 2011, 2012, 2013, 2015, 2016, 2019

- SOCHE Excellence in Teaching (Regional): 2012, 2019

- Ohio Magazine Excellence in Education (Regional): 2013

Research Interest Areas

- Approximate models in nonlinear wave problems
- Traveling and solitary waves
- The existence and stability of coherent structures in nonlinear wave equations
- Perturbation methods for eigenvalue problems
- Numerical analysis
- Fluid dynamics
- Nonlinear optics

Dr. William P. Baker

PhD, Applied Mathematics, Northwestern University

Associate Professor Emeritus of Mathematics

Most Notable Publications

Rutledge JL, **Baker WP**. "Unsteady Effects on the Experimental Determination of Overall Effectiveness". ASME. *Turbo Expo: Power for Land, Sea, and Air,* Volume 5B: Heat Transfer ():V05BT13A006. doi:10.1115/GT2018-75846

Easterday, O., Palazotto, A., **Baker, W.**, and Branam, R., "Damping Properties of Coatings at Elevated Temperatures," *Surface and Coatings Technology*, Vol. 321, pp. 186–199, 2017.

"Stochastic Real-Time Optimal Control for Bearing-Only Trajectory Planning", Ross, S.M., Cobb, R.G., Baker, **W.P.**, *International Journal of Micro Air Vehicles* 6(1):1-28, March 2014.

"Optimal Control of a Librating Electrodynamic Tether Performing a Multi-revolution Orbit Change", Robert Stevens, **William Baker**, *Journal of Guidance Control and Dynamics* 32(5):1497-1507, August 2009.

"A variable stiffness device selection and design tool for lightly damped structures", M.F. Winthrop, **W.P. Baker**, R.G. Cobb, *Journal of Sound and Vibration* 287(4-5):667-682, November 2005.

Ross, S.M., Cobb, R.G., **Baker, W.P.**, and Harmon, F., "Implementation lessons and pitfalls for real-time optimal control with stochastic systems," *Journal of Optimal Control Applications and Methods*, Vol. 36,No. 2, pp. 198-217, Mar 2015.

Research Interest Areas

- Asymptotic and Perturbation Methods
- Wave Propagation and Scattering Theory
- Optimal Control Theory
- Thermal Dynamics of high speed wear events
- Vibrational dynamics of thermal loaded materials
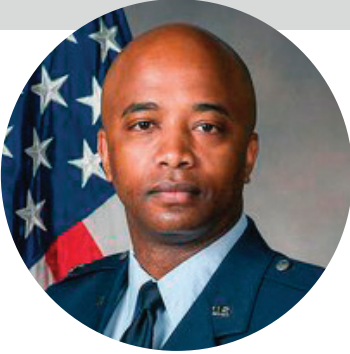
Lt Col Eric L. Brooks

PhD, Applied Mathematics, Air Force Institute of Technology

Assistant Professor of Statistics
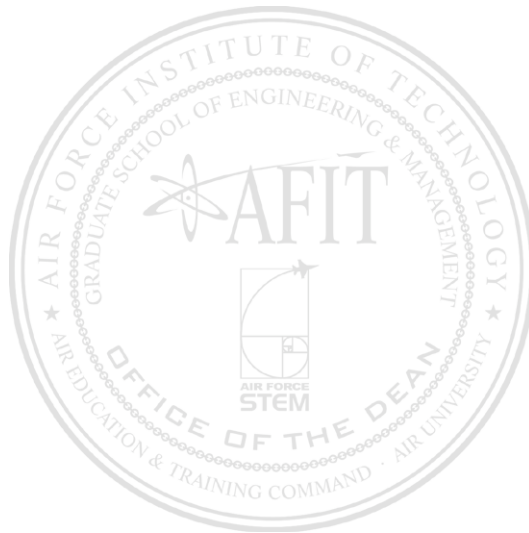
Dr. Dursun A. Bulutoglu

PhD, Statistics, University of California, Berkeley, California

Associate Professor of Statistics

Most Notable Publications

D.A. Bulutoglu and C.S. Cheng "Hidden Projection Properties of Some Nonregular Fractional Factorial Designs and Their Applications" *The Annals of Statistics* 31, 1012-1026, (2003).

D.A. Bulutoglu and C.S. Cheng "Construction of E(s2)-optimal Supersaturated Designs" *The Annals of Statistics* 32, 1662-1678, (2004).

G. Roelke, R. Baldwin and **D.A. Bulutoglu** "Analytical Models for the Performance of Von Neumann Mulitplexing" *IEEE Transactions on Nanotechnology* 6, 2007.

K.J. Ryan and **D.A. Bulutoglu** "E(s2)-optimal Supersaturated Designs with Good Minimax Properties" *Journal of Statistical Planning and Inference* 137, 2250-2262, 2007.

D.A. Bulutoglu "Cyclically Generated Supersaturated Designs" *Journal of Statistical Planning and Inference* 137, 2413-2428, 2007.

D.A. Bulutoglu and F. Margot "Classification of Orthogonal Arrays by Integer Programming" *Journal of Statistical Planning and Inference* 138, 654-666, 2008.

Research Interest Areas

- Design of Experiments
- Discrete Optimization
- Combinatorial Optimization

Dr. Matthew Fickus

PhD, Mathematics, University of Maryland

Professor of Mathematics

Most Notable Publications

M. Fickus, J. Jasper, D. G. Mixon, "Packings in real projective spaces," SIAM *J. Appl. Algebra Geom*. 2 (2018) 377-409.

M. Fickus, J. Jasper, D. G. Mixon, J. D. Peterson, C.E. Watson, "Equiangular tight frames with centroidal symmetry," *Appl. Comput. Harmon. Anal.* 44 (2018) 476–496.

M. Fickus, J. Jasper, D. G. Mixon, J. D. Peterson, "Tremain equiangular tight frames," *J. Combin. Theory Ser.* A. 153 (2018) 54–66.

M. Fickus, D. G. Mixon, J. Jasper, "Equiangular tight frames from hyperovals," *IEEE Trans. Inform. Theory.* 62 (2016) 5225-5236.

A. S. Bandeira, **M. Fickus**, D. G. Mixon, J. Moreira, "Derandomizing restricted isometries via the Legendre symbol," *Constr. Approx.* 43 (2016) 409-424.

Selected Honors & Awards

- Department of Mathematics & Statistics Instructor of the Year (2016 & 2017).

Research Interest Areas

- Applied harmonic analysis, including applications of frame theory
- Compressed sensing and wavelets to problems of waveform design for radar and wireless communication
- Coding theory
- Quantum information theory

ENC

Lt Col Robert B. Hartlage

PhD, Operations Research, Air Force Institute of Technology

Assistant Professor of Statistics

Research Interest Areas

- Metaheuristics
- Network Optimization
- Applications in Transportation & Communication
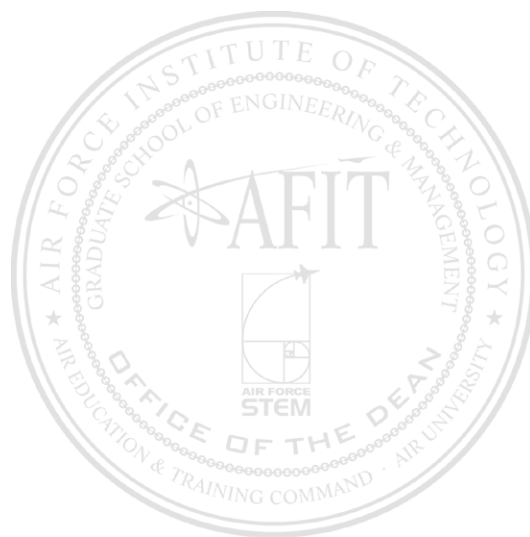
Capt Chancellor AJ Johnstone

PhD, Statistics, Iowa State University

Assistant Professor of Statistics

Selected Honors & Awards

- Air Force Junior Analyst of the Year 2016

Research Interest Areas

- Nonparametric Statistics

- Conformal Prediction

- Robust Optimization
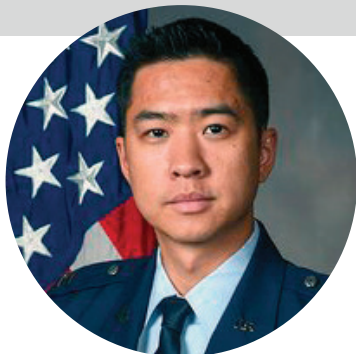
Capt Tony Liu

PhD, Applied Mathematics, Arizona State University

Assistant Professor of Mathematics

Most Notable Publications

Liu, T., & Platte, R. B. (2021). "Node Generation for RBF-FD Methods by QR Factorization," *Mathematics*, 9(16), 1845.

Akers, B., **Liu, T.**, & Reeger, J. (2021). "A Radial Basis Function Finite Difference Scheme for the Benjamin–Ono Equation," *Mathematics*, 9(1), 65.

Wing, A., **Liu, T.**, & Palazotto, A. (2021). "Modeling a high-speed pin-on-disk experiment," *The Journal of Defense Modeling and Simulation*, 15485129211040379.

Liu, T., & Pond, K. (2016). "Modeling and estimating continuous Improvised Explosive Device supply chain behavior," *The Journal of Defense Modeling and Simulation*, 13(1), 67-75.

Selected Honors & Awards

- NSF Research Training Group Fellow, Arizona State University 2016-2019

- AFOSR Visiting Scientist Program Award Winner 2021

Research Interest Areas

- Numerical Analysis
- Computational Methods
- Approximation Theory
- RBF Methods

Maj Benjamin R. Mayo

PhD, Applied Mathematics, Air Force Institute of Technology

Assistant Professor of Mathematics

Most Notable Publications

Fickus, Matthew, and **Benjamin R. Mayo**. "Mutually unbiased equiangular tight frames." *IEEE Transactions on Information Theory* 67.3 (2020): 1656-1667.

Mayo, Benjamin R., Todd J. Paciencia, and Daniel P. Croghan. "BRAWLER to CFAM: incorporating stochastic engagement-level data in deterministic campaign models." *2016 Winter Simulation Conference* (WSC). IEEE, 2016.

Selected Honors & Awards

- United States Air Force (USAF) Junior Scientist of the Year (2013)

- Military Operations Research Society (MORS) James T. Moore Graduate Research Prize (2015)

- Military Operations Research Society (MORS) Richard H. Barchi Prize (2016)

- Military Operations Research Society (MORS) Wayne P. Hughes Award (2017)

Research Interest Areas

- Optimization
- Harmonic Analysis
- Frame Theory

- Design of Experiments
- ANOVA

Maj Dana F. Morrill

PhD, Applied Mathematics, Air Force Institute of Technology

Assistant Professor

Most Notable Publications

Journal Articles:
Hill, R. R., Ahner, D. K., **Morrill, D. F.**, Talafuse, T. P., & Bestard, J. J. "Applying statistical engineering to the development of a ballistic impact ash model." *Quality Engineering* 29.2 (2017): 181-189.

Conference Proceedings:
Morrill, Dana & Benjamin Akers. "High Energy Laser Propagation: Environmental E_ects." Propagation through and Characterization of Atmospheric and Oceanic Phenomena. *Optical Society of America*, 2017.

Refereed Conference Proceedings:
Morrill, Dana & Benjamin Akers. "High Energy Laser Propagation: Environmental E_ects." Propagation through and Characterization of Atmospheric and Oceanic Phenomena. *Optical Society of America*, 2018.

Morrill, Dana & Benjamin Akers. "High Energy Laser Propagation: Modeling Scintillation E_ects." Propagation through and Characterization of Atmospheric and Oceanic Phenomena. *Optical Society of America*, 2019.

Research Interest Areas

- Numerical solutions to differential equations
- Fluid dynamics
- Numerical linear algebra

Lt Col Beau A. Nunnally

PhD, Applied Mathematics, Air Force Institute of Technology

Assistant Professor of Statistics

Most Notable Publications

Nunnally, Beau A., "Statistical Inference to Evaluate and Compare the Performance of Correlated Multi-State Classification Systems" (2018). *Theses and Dissertations*. 1914. https://scholar.afit.edu/etd/1914

Nunnally, Beau A., "Using Multiattribute Utility Copulas in Support of UAV Search and Destroy Operations" (2012). *Theses and Dissertations*. 1228. https://scholar.afit.edu/etd/1228

Research Interest Areas

- Response Surface Methodologies
- Applications in Biostatistics
- Design of Experiments
- Linear and Non-Linear Regression
- Statistical Simulation

Dr. Mark E. Oxley

PhD, Mathematics, North Carolina State University

Professor of Mathematics

Most Notable Publications

D.W. Ruck, S.K. Rogers, M. Kabrisky, **M.E. Oxley**, "The multilayer perceptron as an approximation to a Bayes optimal discriminant function", *IEEE transactions on Neural Networks* 1 (4), pp 296-298, 1990. Cited 1054 times: Google Scholar 12 Oct 2021.

R.P. Broussard, S.K. Rogers, **M.E. Oxley**, G.L. Tarr, "Physiologically Motivated Image Fusion for Object Detection using a Pulse Coupled Neural Network", *IEEE Transactions on Neural Networks* 10 (3), 554-563. Cited 267 times, Google Scholar 12 Oct 2021.

J.P. Kharoufeh, S.M. Cox, **M.E. Oxley**, "Reliability of manufacturing equipment in complex environments," *Annals of Operations Research* 209 (1), 231-254. Cited 45 times: Google Scholar 12 Oct 2021.

C.M. Schubert Kabban, S. N. Thorsen, **M. E. Oxley**, "The ROC manifold for classification systems", *Pattern Recognition* 44 (2), pp 350-362, 2011. Cited 32 times: Google Scholar 12 Oct 2021.

A.V. Lair, M. E. Oxley, "A Necessary and Sufficient Condition for Global Existence for a degenerate parabolic boundary value problem", *Journal of Mathematical Analysis and Applications* 221 (1), 338-349, 1998. Cited 26 times: Google Scholar 12 Oct 2021.

Selected Honors & Awards

- AFIT-ENC Instructor of the Quarter (Departmental), 1991

- AFIT Gage H. Crocker Outstanding Professor Award, 2003

- AFTAC honor of being selected for Endowed Term Chair AI/ML, October 22, 2019 – current

Significant Accomplishments

- Claudia V. Kropas-Hughes, Steven K. Rogers, Mark E. Oxley, Matthew Kabrisky, Autoassociative-Heteroassociative Neural Network, Patent no. US 6,401,082, 4 Jun 2002.

Research Interest Areas

- Partial differential equations (free and moving boundary value problems, finite-time extinction problems, differential equations in Banach spaces, reaction-diffusion equations)

- Applied analysis (functional analysis, optimization, wavelet analysis, category theory).

- Information fusion (classifier fusion, sensor fusion, evaluation of fusion techniques, receiver operating characteristic curves, manifolds, and analysis).

Maj Tyler Pierce

PhD, Applied Mathematics, Air Force Institute of Technology

Assistant Professor of Mathematics

Selected Honors & Awards

- Honor Societies: Tau Beta Pi, Omega Chi Epsilon, Omega Rho

- Distinguished Graduate of Air Force Institute of Technology (MS - Operations Research)

Research Interest Areas

- Numerical Methods
- Partial Differential Equations
- Stability Analysis
- Wave Modeling

Dr. Christine Schubert Kabban

PhD, Applied Mathematics, Air Force Institute of Technology

Professor of Statistics

Most Notable Publications

Schubert Kabban, C., Uber, R., Lin, K., Lin, B., Bhuiyan, Md.Y., Giurgiutiu, V. "Uncertainty Evaluation in the Design of Structural Health Monitoring Systems for Damage Detection". *Aerospace Journal* 5(2): 45, 2018. DOI: 10.3390/aerospace5020045.

Mohd-Zaid, F., **Schubert Kabban, C.M.**, Deckro, R.F. "A Test on the L-moments of the Degree Distribution of a Barabási-Albert Network for Detecting Nodal and Edge Degradation". *Journal of Complex Networks* 6(1): 24-53, Feb 2018. DOI: 10.1093/comnet/cnx020.

Grap, M.J., Munro, C.L., **Schubert, C.M.**, Wetzel, P.A., Burk, R.S., Pepperl, A., Lucas, V. "Lack of Association of High Backrest With Sacral Tissue Changes in Adults Receiving Mechanically Ventilation". *American Journal of Critical Care* 27(2): 104-113, Mar 2018. DOI: 10.4037/ajcc2018419.

Hefron, R., Borghetti, B.J., Christensen, J.C., **Schubert Kabban, C.M.** "Deep long short-term memory structures model temporal dependencies improving cognitive workload estimation". *Pattern Recognition Letters* (IEEE), 94(15): 96-104, July 2017. DOI: 10.1016/j.patrec.2017.05.020.

Brandt, Y., Currier, L., Plante, T.W., **Schubert Kabban, C.M.**, Tvaryanas, A.P. "A Randomized Controlled Trial of Core Strengthening Exercises in Helicopter Crewmembers with Low Back Pain". *Aerospace Medicine and Human Performance* 86(10): 889-894, 2015.

Selected Honors & Awards

- 2018 Southwestern Ohio Council for Higher Education (SOCHE) Faculty Excellence Award

Research Interest Areas

- ROC curves
- Performance of Classification and Detection Methods
- Biostatistics
- Nonparametrics
- Regression Modeling
- Statistical Simulation
- Information Fusion and Big Data
- Epidemiology
- Structural Health Monitoring
- Feature Extraction
- Design of Experiments
- Categorical Data Analysis

Capt Victoria R. C. Sieck

PhD, Statistics, University of New Mexico

Professor of Statistics

Most Notable Publications

Sieck VRC, Christensen FGW. "A framework for improving the efficiency of operational testing through Bayesian adaptive design." *Qual Reliab Eng Int*. 2020; 1-16

Selected Honors & Awards

- Graduated with Distinction, PhD in Statistics, University of New Mexico

- Outstanding Graduate in Research, Department of Mathematics and Statistics, University of New Mexico

Research Interest Areas

- Bayesian Analysis
- Design of Experiments
- Adaptive Testing Methods

Capt Jonathan S. Turner

PhD, Applied Mathematics (Statistics), Air Force Institute of Technology

Assistant Professor

Selected Honors & Awards

- Air Force Commendation Medal
- Air Force Achievement Medal
- Global War on Terrorism Medal

Research Interest Areas

- Combinatorics
- Design of Experiments
- Difference Sets
- Multiplier Theory
- Optimization (Deterministic and Heuristic)
- Response Surface
- Simulation (Agent Based)

Lt Col Christopher Weimer

PhD, Operations Research, Air Force Institute of Technology

Assistant Professor of Statistics

Most Notable Publications

Weimer, C. W., Miller, J. O., Hill, R. R., & Hodson, D. D. (2019). "Agent scheduling in opinion dynamics: A taxonomy and comparison using generalized models." *Journal of Artificial Societies and Social Simulation*, 22(4), 5.

Weimer, C. W., Miller, J. O., & Hill, R. R. (2016). "Agent-based modeling: An introduction and primer." *In Proceedings of the 2016 Winter Simulation Conference*, (pp. 65-79). IEEE Press.

Weimer, C. W., Miller, J. O., Friend, M., & Miller, J. (2013). "Forecasting effects of MISO actions: an ABM methodology." *In Proceedings of the 2013 Winter Simulation Conference*, (pp. 2762-2771). IEEE Press.

Selected Honors & Awards

- 2020 Field Grade Officer of the Year, Air Force Installation and Mission Support Center

- 2020 Team of the Year, Air Force Installation and Mission Support Center

- 2018 Analytic Team of the Year, Air Force Materiel Command

Research Interest Areas

- Opinion dynamics
- Agent-based modeling and simulation
- Computational sociology
- Generative social science

- Machine learning
- Optimization
- Applied statistics

Dr. Edward D. White

PhD, Statistics, Texas A&M University

Professor of Statistics

Most Notable Publications

"Unmasking Cost Growth Behavior: A Longitudinal Study", *Defense Acquisition Research Journal* 25(1), 30-51, Cory D'Amico, **Edward White**, Jonathan Ritschel, and Scott Kozlak, 2018.

"Comparison of Body Composition Metrics for United States Air Force Airmen", *Military Medicine* 183(3-4), e201–e207, J.R. Griffith, **Edward D. White**, R. David Fass, and Brandon M. Lucas, 2018. https://doi.org/10.1093/milmed/usx053

"Wavelet ANOVA Bisection Method for Identifying Simulation Model Bias", *Simulation Modelling Practice and Theory* 80, 66-74, Andrew Atkinson, Raymond Hill, Joseph Pignatiello Jr., G. Geoffrey Vining, **Edward White**, Eric Chicken, 2018.

"Model Validation of Functional Responses Across Experimental Regions Using Functional Regression Extensions to the CORA Objective Rating System", *Journal of Verification, Validation and Uncertainty Quantification* 2(4), 041004-041004-9, Scott M. Storm, Raymond R. Hill, Joseph J. Pignatiello, G. Geoffrey Vining and **Edward D. White**, 2017. DOI: 10.1115/1.4039303.

"Forecasting U.S. Army Enlistment Contract Production in Complex Geographical Marketing Areas", *Journal of Defense Analytics and Logistics* 1(1), 69-87, Joshua L. McDonald, **Edward D. White**, Raymond R. Hill, and Christian Pardo, 2017. https://doi.org/10.1108/JDAL-03-2017-0001

Selected Honors & Awards

- Dr. Leslie M. Norton Teaching Excellence Award (2016, 2017)

- Southwestern Ohio Council for Higher Education (SOCHE) Faculty Excellence Award winner (2016)

Research Interest Areas

- Design of Experiments
- Biostatistics
- Growth Curves
- Linear and Nonlinear Regression
- Categorical Data Analysis
- Log-Linear Models
- Statistical Simulation
- Response Surface Modeling
- Big Data Analytics

Dr. Aihua Wood

PhD, Mathematics, University of Connecticut

Professor of Mathematics

Research Interest Areas

- Partial differential equations
- Electromagnetic wave propagation
- Rarefied gas dynamics
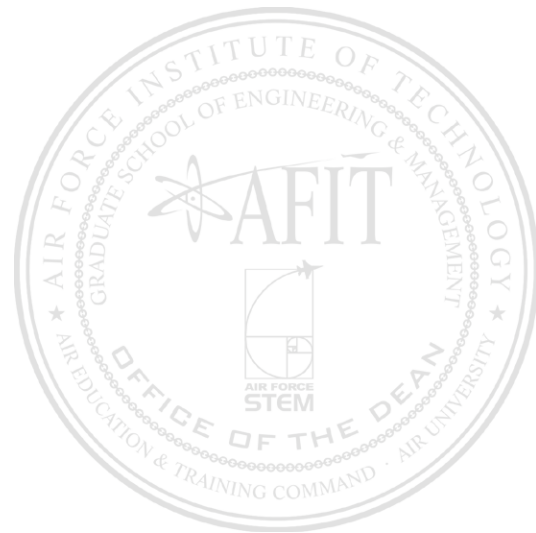
Dr. Jeffery D. Weir

PhD, Industrial Engineering and Operations Research, Georgia Institute of Technology

Interim Department Head, Operational Sciences

Professor of Operations Research

Most Notable Publications

Hanks, R, **Weir, J D**, and Lunday, B, "Robust goal programming using different robustness echelons via norm-based and ellipsoidal uncertainty sets," *European Journal of Operations Research*, Vol 262, no 2, pp 636-646, 2017.

McNabb, M, **Weir, J D**, Hil, R and Hall, S, "Testing local search move operators on the vehicle routing problem with split deliveries and time windows," *Computers & Operations Research*, Vol 56, pp 93-109, 2015.

Cui, C, Wu, T, Hu, M, **Weir, J D**, and Li, X, "Short-term building energy model recommendation system: A meta-learning approach," *Applied Energy*, Vol 172, pp 251-263, 2016.

Hu, M, **Weir, J D**, Wu, T, "Decentralized operation strategies for an integrated building energy system using a memetic algorithm," *European Journal of Operational Research*, Vol 217, no 1, pp 185-197, 2012.

Chambal, S P, **Weir, J D**, Kahraman, Y R, and Gutman, A J "A practical procedure for customizable one-way sensitivity analysis in additive value models," *Decision Analysis*, Vol 8, no 1, pp 251-330, 2011.

Research Interest Areas

- Decision Analysis
- Applied Statistics
- Deterministic Optimization

Dr. Darryl K. Ahner, PE

PhD, Systems Engineering (Operations Research), Boston University

Dean for Research

Professor of Operations Research

Most Notable Publications

Ahner, Darryl K., and Carl R. Parson. "Optimal multi-stage allocation of weapons to targets using adaptive dynamic programming." *Optimization Letters* 9, no. 8 (2015): 1689-1701.

Ahner, D. and McCarthy, A. "Response surface modeling of precision-guided fragmentation munitions," *The Journal of Defense Modeling and Simulation* 17, no. 1 (2020): 83-97.

Keith, Andrew J., and **Darryl K. Ahner.** "A survey of decision making and optimization under uncertainty." *Annals of Operations Research* 300.2 (2021): 319-353.

Kline, Alexander, **Darryl Ahner**, and Raymond Hill. "The weapon-target assignment problem." *Computers & Operations Research* 105 (2019): 226-236.

Kline, Alexander G., **Darryl K. Ahner**, and Brian J. Lunday. "Real-time heuristic algorithms for the static weapon target assignment problem." *Journal of Heuristics* 25, no. 3 (2019): 377-397

Selected Honors & Awards

- The Office of the Secretary of Defense Medal for Exceptional Civilian Service. 2021

- Affiliate Society Council of Dayton Outstanding Engineers & Scientists. 2017

- E. Grosvenor Plowman Award for Best Paper at Council of Supply Chain Management Professionals Global Conference. 2014

- 2012 Colonel Charles A. Stone Award (AFIT mission impact). 2012

- Legion of Merit for Analysis. 2008

Significant Accomplishments

- Founding Director, Office of the Secretary of Defense Scientific Test and Analysis Techniques Center of Excellence (STAT CoE). 2012-2021

- Program and Curriculum Chair, Data Analytics. 2019-2021

- Vice President, Secretary of the Society, Military Operations Research Society. 2016-2017

- Vice President for Professional Development, Military Operations Research Society. 2015-2016

Research Interest Areas

Probabilistic Operations Research Applications to include: Optimization of Stochastic Models, Simulation Modeling, Dynamic Programming – sequential decision making under uncertainty, Test & Evaluation, Software Testing, Information Theory, and Military Operations Research Applications

Col Jason R. Anderson

PhD, Business Administration, Saint Louis University

Assistant Professor of Logistics and Supply Chain Management

Most Notable Publications

Anderson, J. R., Ogden, J. D., Cunningham, W. A., & Schubert-Kabban, C. (2017). "An exploratory study of hours of service and its safety impact on motorists." *Transport Policy*, 53, 161-174.

Anderson, Jason, William Cunningham, and Seong-Jong Joo. "Examining the Economic Impacts of the Increased Fuel Efficiency Standards on State Gas-Tax Revenues." *Journal of Accounting & Finance* (2158-3625) 18.6 (2018).

Yacan Wang, **Jason Anderson**, Seong-Jong Joo and Joseph R. Huscroft. "The Leniency of Return Policy and Consumers' Repurchase Intention in online retailing." *Industrial Management & Data Systems* 635502 Oct (2019).

Selected Honors & Awards

- AFIT Centennial Mentor of the Year, 2019

- MOAA (MILITARY OFFICERS ASSOCIATION OF AMERICA) Operational Sciences Faculty Winner, 2019

- AFIT ENS SOCHE Award Winner, 2018

- AFIT ENS Professor of the Year, 2018

- ASAM Professor of the Year, 2017

- The Air Force Historical Foundation Bryce Poe II Award: Anderson, Jason R. (2013), "Drawing the Red Line: The Cost Benefit Analysis on Larger Life Rafts"

Research Interest Areas

- Transportation
- Logistics Management
- Inventory
- Sourcing

- Operations Management
- Supply chain resilience
- Simulation
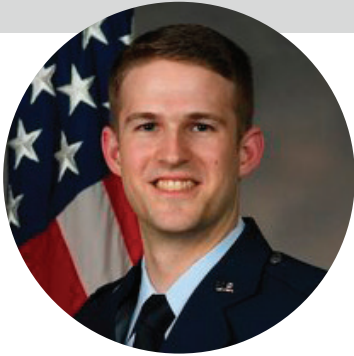
Capt Nicholas Boardman

PhD, Industrial Engineering, University of Arkansas

Assistant Professor of Operations Research

Most Notable Publications

Boardman, N.T., & Sullivan, K.M. (2021) "Time-Based Node Deployment Policies for Reliable Wireless Sensor Networks." *IEEE Transactions on Reliability*.

Boardman, N.T., Lunday, B.J., & Robbins, M.J. (2017) "Heterogeneous Surface-to-Air Missile Defense Battery Location: A Game Theoretic Approach." *Journal of Heuristics*, 23(6), 417-447.

Selected Honors & Awards

- Distinguished Doctoral Fellowship, University of Arkansas (2018)

- Distinguished Graduate, Air Force Institute of Technology (2016)

- Dean's Award Winner (Best Master's Thesis), Air Force Institute of Technology (2016)

- Distinguished Graduate, United States Air Force Academy (2014)

Research Interest Areas

- Network optimization
- Reliability and maintenance of complex systems
- Game theory and strategic interactions
- Heuristics

Dr. Lance E. Champagne

PhD, Operations Research, Air Force Institute of Technology

Assistant Professor of Operations Research

Most Notable Publications

Champagne, L. E. and R. R. Hill, October 2009. "A Simulation Validation Method Based on Bootstrapping Applied to an Agent-Based Model of the Bay of Biscay Historical Scenario". *Journal of Defense Modeling and Simulation: Applications, Methodology, Technology* Vol. 6, No. 4, 201-212.

Hill, R. R., R. G. Carl, **L. E. Champagne**. 2006. "Using Agent Simulation Methods to Examine and Investigate Search Theory Against a Historical Case Study". *Journal of Simulation*, Vol. 1, No. 1, 29-38.

Hill, R. R., **L. E. Champagne**, and J. C. Price. 2004. "Using Agent-Based Simulation and Game Theory to Examine the WWII Bay of Biscay U-Boat Campaign". *Journal of Defense Modeling and Simulation*, Vol. 1, No. 2, pp. 99-109.

Research Interest Areas

- Agent-based and discrete event simulation
- Applied and multivariate statistics

Dr. Frank W. Ciarallo

PhD, Industrial Administration, Carnegie Mellon University

Associate Professor of Logistics & Supply Chain Management

Most Notable Publications

B. Fouts, J. Serres, R. Hill, **F.W. Ciarallo**, (2018) "Application Development for Optimizing Patient Placement on Aeromedical Evacuation Flights: Proof-of-Concept", *Air Force Research Lab, 711th Human Performance Wing, Technical Report*, Report Number AFRL-SA-WP-SR-2018-001, https://apps.dtic.mil/docs/citations/AD1045050

F.W. Ciarallo, K.K. Ward, R.R Hill, (2017) "Modeling Airline Boarding for Improved Efficiency and Passenger Experience", *Proceedings of the 2017 Industrial and Systems Engineering Conference*, Pittsburgh, PA, 1900-1905, https://search.proquest.com/docview/1951119310

A. Lowas, **F.W. Ciarallo**, (2016) "Reliability and operations: Keys to lumpy aircraft spare parts demands", *Journal of Air Transport Management*, 50(1), 30-40, https://doi.org/10.1016/j.jairtraman.2015.09.004

F.W. Ciarallo, S. Niranjan, N. Brown, (2016) "A Salt Inventory Management Strategy for Winter Maintenance", *Operations and Supply Chain Management: An International Journal*, 9(1), 31-49, http://doi.org/10.31387/oscm0230159

M.J. Bova, **F.W. Ciarallo**, R.R. Hill, (2016) "Development of an Agent-Based Model for the Secondary Threat Resulting from a Ballistic Impact Event", *Journal of Simulation*, 10(1), 24-35, DOI: 10.1057/jos.2015.1

Selected Honors & Awards

- 2013 Faculty Award for Excellence in Service, College of Engineering & Computer Science, Wright State University

- 2012 Moving Spirit Award, Institute for Operations Research and the Management Sciences (INFORMS)

Significant Accomplishments

- Co-Editor, Journal of Defense Analytics & Logistics, 2019

Research Interest Areas

Strategies for Centralization of Stock in Pharmaceutical Distribution Networks, Study of Aircraft Component Failures Leading to Lumpy Spare Part Demands, Two-Echelon Inventory Systems with Transshipment and Quantity Discounts, Warehouse Picking Operations including Picker Congestion, Evaluating Airline Boarding Strategies for Passenger Aircraft, Evaluating Block Chain Capabilities to Fulfill Information Needs of the Healthcare System, Modeling Situation Awareness of Agents Navigating on a Network with Imperfect Information, Helper Objectives in Multiobjectivization for Job Shop Scheduling.

Dr. Bruce A. Cox

PhD, Industrial Engineering, Georgia Institute of Technology

Assistant Professor of Operations Research

Most Notable Publications

Cox, B., Juditsky, A., Nemirovski, A., "Decomposition Techniques for Bilinear Saddle Point Problems and Variational Inequalities with Affine Monotone Operators," *Journal of Optimization Theory and Applications*, 2015.

Cox, B., Bishop, B., "A Monte Carlo Approach to Estimating Test Duration and Statisitcal Power," *The ITEA Journal*, 2015.

Cox, B., Juditsky, A., Nemirovski, A., "Dual subgradient algorithms for large-scale nonsmooth learning problems," *Mathematical Program* Series B, 148:1-2, 2014.

Selected Honors & Awards

- Bronze Star
- Defense Meritorious Service Medal with one oak leaf cluster
- Meritorious Service Medal
- Air Force Commendation Medal with one oak leaf cluster
-
- Air Force Achievement Medal
- Air Force Recognition Ribbon (AFA's Howard W. Leaf Award)
- National Defense Service Medal
- Global War on Terrorism Expeditionary Medal
- Global War on Terrorism Service Medal
- AF Overseas Ribbon Short
- Air Force Expeditionary Service Ribbon with Gold Border
- AF Longevity Service with two oak leaf clusters
- Small Arms Expert Markmanship Ribbon with oak leaf cluster
- AF Training Ribbon
- NATO Medal

Research Interest Areas

- Linear and Convex Optimization
- Robust Optimization
- Optimal Control

Dr. William A. Cunningham III

PhD, Economics, University of Arkansas

Professor of Logistics and Supply Chain Management

Most Notable Publications

Cunningham, W. A. "Examining the Economic Impacts of the Increased Fuel Efficiency Standards on State Gas-Tax Revenues", (with Jason Anderson, and Seong Joo), accepted in *Journal of Accounting and Finance*, to be published in volume 18(6), 2018.

Cunningham, W. A. "An exploratory study of hours of service and its safety impact on motorists", (with Anderson, J. R*., Ogden, J. D., & Schubert-Kabban, C.) *Transport Policy*, 2017, 53, 161-174.

Cunningham, W. A. "Managing hub and Spoke Networks: A Military Case Comparing Time and Cost", (with Joseph Skipper, Christopher Boone, and Raymond Hill), *Journal of Global Business and Technology*, Vol 12 No. 1, Spring 2016, pp. 33-47.

Research Interest Areas

- Strategic Mobility
- Cost/Benefit Analysis
- Econometric Modelling
- Costing
- Privatization and A-76 Studies

- Modal Choice Network Analysis
- Location Analysis
- Supply Chain Management
- RFID

Dr. Richard F. Deckro

Doctorate of Business Administration, Decision Science, Kent State University

Distinguished Professor of Operations Research

Joint Warfare Analysis Center Chair of Applied Operations Research

Director, Future Operations Investigation Laboratory (FOIL)

Most Notable Publications

William N. Caballero, Brian J. Lunday & **Richard F. Deckro** "Leveraging Behavioral Game Theory to Inform Military Operations Planning", forthcoming in *Military Operations Research*.

Jared K. Nystrom, Matthew J. Robbins, **Richard F. Deckro**, & James F. Morris, "Simulating Attacker and Defender Strategies within a Dynamic Game on Network Topology", *Journal of Simulation*, Vol. 12, No 4, 2018, pages 307 – 331.

J. Todd Hamill, **Richard F. Deckro**, Robert F. Mills, & James W. Chrissis, "Reach-Based Assessment of Position", *Military Operations Research*, Vol. 13, No 4, (2008), pp. 59-78. (2008 INFORMS MAS Koopman Award).

J. Todd Hamill, **Richard F. Deckro** & John M. Kloeber, Jr "Evaluating information Assurance Strategies", *Decision Support Systems*, Vol. 39 No.3, Pages 463-484.

Victor D. Wiley, **Richard F. Deckro**, & Jack A. Jackson, "Optimization Analysis for Design and Planning of Multi-Project Programs", *European Journal of Operational Research*, Vol 107 No.2, 1998, Pages 492-506.

Selected Honors & Awards

- 2017 J. Steinhardt Prize Military Applications Society, INFORMS
- Named 1st Editor Emeritus, Military Operations Research
- 2016 Fellow, Military Operations Research Society
- Air Force Analyst Lifetime Achievement Award, 2009
- Clayton J. Thomas Award, Military Operations Research Society, 2009

Significant Accomplishments

- US Panel Member - Systems Analysis and Studies Panel, NATO Science and Technology Organization, (Dec. 2016- present)
- Member, 2019 NATO OR&A Conference Programme Committee

Research Interest Areas

- Information operations
- Irregular warfare
- Counterterrorism
- Social network modeling and analysis
- Applied mathematical programming and optimization
- Project and program management
- Campaign modeling
- Scheduling
- Network models
- Multi-criteria decision making
- Decision analysis

Lt Col John M. Dickens

PhD, Logistics Systems, University of North Texas

Deputy Department Head

Assistant Professor of Logistics and Supply Chain Management

Most Notable Publications

- Glassburner et al., "Theory of Paradox Within Service-Dominant Logic," *Service Science*, June 2018.

- **J. Dickens**, "The Exceptional Release," 24-29, Spring 2013.

Selected Honors & Awards

- ENS 2018 Professor of the Year

Research Interest Areas

- Supply chain resilience
- Logistics service quality
- Value creation
- Value co-production and supply chain analytics

Dr. Mark A. Gallagher

PhD, Operations Research, Air Force Institute of Technology

Professor of Practice in Operations Research

Most Notable Publications

Gallagher, Mark A., Kenneth W. Bauer Jr, and Peter S. Maybeck. "Initial data truncation for univariate output of discrete-event simulations using the Kalman filter." *Management Science* 42, no. 4 (1996): 559-575. https://doi.org/10.1287/mnsc.42.4.559

Gallagher, Mark A., and David A. Lee. "Final-Cost Estimates for Research & Development Programs Conditioned on Realized Costs." *Military Operations Research* 2, no. 2 (1996): 51-65.

Gallagher, Mark A., and Elizabeth J. Kelly. "A new methodology for military force structure analysis." *Operations research* 39, no. 6 (1991): 877-885. https://doi.org/10.1287/opre.39.6.877

Gallagher, Mark A., and Albert H. Moore. "Robust minimum-distance estimation using the 3-parameter Weibull distribution." *Reliability, IEEE Transactions* on 39, no. 5 (1990): 575-580. DOI: 10.1109/24.61314

Lee, David A., Michael R. Hogue, and Mark A. Gallagher. "Determining a budget profile from a R&D cost estimate." *The Journal of Cost Analysis* 14, no. 2 (1997): 29-41. https://doi.org/10.1080/08823871.1997.10462311

Selected Honors & Awards

- Meritorious Senior Career Professional – Presidential Rank Award (2018)

- Fellow of Society, Military Operations Research Society, 2014

- Clayton J. Thomas Award, Military Operations Research Society, 2013

- Rist Prize, Military Operations Research Society, 2002 & 2003

- Barchi Prize, Military Operations Research Society, 1990 & 1995

Significant Accomplishments

- Chair of the Board, Snyder-Robinson Foundation, 2019-present

- Council Member, Military and Security Society, 2019-present

- INFORMS Prize Committee Chair, Institute for Operations Research and Management Sciences (INFORMS), 2019-2020

- Vice President for Society Services, Military Operations Research Society, 2009-2010

Research Interest Areas

- Military force structure analysis
- Model resolution

- Bayesian analysis

Maj Michael J. Garee

PhD, Industrial Engineering, Purdue University

Assistant Professor of Operations Research

Most Notable Publications

Garee, M., Chan, W.K.V., Wan, H., 2018, "Regression-based Social Influence Networks and the Linearity of Aggregated Belief," *Proc. Winter Simulation Conference*. Available online at: https://doi.org/10.1109/WSC.2018.8632423.

Garee, M., Hill, R.R., Ahner, D.K., Czarnecki, G., 2017, "Fragment capture simulation for MANPADS test arena optimization," *Journal of Simulation*, Volume 11, Issue 2, pp 75-86. Available online at: https://doi.org/10.1057/jos.2016.9.

Selected Honors & Awards

- Inductee in Tau Beta Pi national engineering honor society (2019)

- Inductee in Omega Rho operations research honor society (2014)

Significant Accomplishments

- Program Committee member for Winter Simulation Conference 2020

Research Interest Areas

- Agent-based simulation
- Data visualization
- Computer science
- Engineering education

Dr. Nathan B. Gaw

PhD, Industrial Engineering, Arizona State University

Assistant Professor of Operations Research

Most Notable Publications

Gaw, N., Yousefi, S., & Reisi Gahrooei, M. (In Press). "Multimodal Data Fusion for Systems Improvement." *IISE Transactions*.

Gaw, N., Hawkins-Daarud, A., Hu, L. S., Yoon, H., Wang, L., Xu, Y., ... & Li, J. (2019). "Integration of machine learning and mechanistic models accurately predicts variation in cell density of glioblastoma using multiparametric MRI." *Scientific reports*, 9(1), 1-9.

Gaw, N., Schwedt, T. J., Chong, C. D., Wu, T., & Li, J. (2018). "A clinical decision support system using multi-modality imaging data for disease diagnosis." *IISE Transactions on Healthcare Systems Engineering*, 8(1), 36-46.

Arun, N., **Gaw, N.**, Singh, P., Chang, K., Aggarwal, M., Chen, B., ... & Kalpathy-Cramer, J. (2021). "Assessing the (un) trustworthiness of saliency maps for localizing abnormalities in medical imaging." *Radiology: Artificial Intelligence*.

Hu, L. S., Ning, S., Eschbacher, J. M., Baxter, L. C., **Gaw, N.**, Ranjbar, S., ... & Mitchell, J. R. (2017). "Radiogenomics to characterize regional genetic heterogeneity in glioblastoma." *Neuro-oncology*, 19(1), 128-137.

Selected Honors & Awards

- Best Paper Award (Applied Track), INFORMS Data Mining & Decision Analytics Workshop, 2019

- Achievement Awards for College Scientists, awarded to 35 Ph.D. students in the state of Arizona for excellent scientific research and academic achievement, 2019

- Harold Wolff-John Graham Award (Best Paper), American Academy of Neurology, 2016

- Harold G. Wolff Lecture Award (Best Paper), American Headache Society, 2015

Significant Accomplishments

- **Director**, Data Analytics & Information Systems (DAIS) Division, Institute of Industrial and Systems Engineers, 2021-2023

- **Co-Chair,** Data Analytics and Information Systems Track, IISE Annual Conference & Expo, 2022

- **Co-Chair**, Workshop on Data Mining & Decision Analytics (DMDA), INFORMS Annual Meeting, 2021

- **U.S. Patent**, Hu, L. S., Li, J., Swanson, K. R., Wu, T., Gaw, N., Yoon, H., & Hawkins-Daarud, A. (2020). Methods for Using Machine Learning and Mechanistic Models for Biological Feature Mapping with Multiparametric MRI. *U.S. Patent Application No. 16/764,837*.

Research Interest Areas

- Multimodality Fusion
- Interpretability
- Trustworthiness
- Semi-Supervised Learning

- Active Learning
- Machine Learning
- Data Science
- Bioinformatics

- Deep Learning
- Post Traumatic Headache

Lt Col Aaron V. Glassburner

PhD, Business-Logistics Systems, University of North Texas

Assistant Professor of Logistics and Supply Chain Management
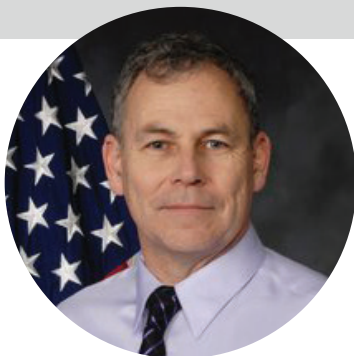
Most Notable Publications

Glassburner, A. V., Nowicki, D. R., Sauser, B., Randall, W. S., & Dickens, J. M. (2018). "Theory of Paradox Within Service-Dominant Logic." *Service Science*, 10(2), 111-123.

Research Interest Areas

- Inventory Theory
- Operations Management
- Supply Chain Resilience

Dr. Raymond R. Hill Jr.

PhD, Industrial and Systems Engineering, Ohio State University

Professor of Operations Research

Most Notable Publications

Hill, R. R. and Pohl, E. A. May 2018. "A Structural Taxonomy for Metaheuristic Optimization Search Methods". Accepted for publication in *International Journal of Metaheuristics*, IJMHEUR-171712.

Lessin, A, B. J. Lunday, and **R. R. Hill**. October 2018. "A Bilevel Exposure-oriented Sensor Location Problem for Border Security". *Computers and Operations Research*, Vol. 98, No. 1, pp: 56-68.

Hill, R. R., Ahner, D. K., Dillard, D. and D. C. Montgomery. April 2018. "Examining Potential Reductions in Wind Tunnel Testing Requirements". Accepted for publication by *Quality and Reliability Engineering International*, QRE-17-0545.

Storm, S. M., **Hill, R. R.**, Pignatiello, J. J, White, E. A. and Vining, G. G. December 2017. "Model Validation of Functional Responses Across Experimental Regions Using Functional Regression Extensions to the CORA Objective Rating System". *Journal of Verification, Validation and Uncertainty Quantification*, Vol. 2, Issue 4, pp: 041004-1:9.

Schofield, J. A., Zens, C. L., **Hill, R. R.**, and Robbins, M. J. March 2018. "Utilizing Reliability Modeling to Analyze United States Air Force Officer Retention". *Computers & Industrial Engineering*, Vol. 117, pp. 171-180.

Selected Honors & Awards

- Air Force Outstanding Science and Engineering Educator Award (2016)

- Affiliates Societies Council Outstanding Engineer and Scientist's Award (2016)

- AETC Nominee for Air Force Senior Analyst of the Year (2016)

Research Interest Areas

- Applied Statistics
- Mathematical Optimization
- Heuristic Search Methods

- Applied Simulation Modeling/Analysis
- Agent Based Modeling
- Validation

Lt Col Timothy W. Holzmann

PhD, Industrial Engineering, Clemson University

Assistant Professor of Operations Research

Most Notable Publications

Holzmann, T. and Smith, J.C. "Modeling the Shortest Path Interdiction Problem with Randomized Strategies." *Proceedings of the 2019 IISE Annual Conference*, May 2019, Orlando, FL.

Holzmann, T. and Smith, J.C. "The Shortest Path Interdiction Problem with Arc Improvement Recourse: A Multi-objective Approach." *Naval Research Letters*, 66(3): 230-252, 2019.

Holzmann, T. and Smith, J.C. "Solving discrete multi-objective optimization problems using modified augmented weighted Tchebychev scalarizations." *European Journal of Operations Research*, 271(2): 436-449, 2018.

Holzmann, T. and Cochran, J. "A Stochastic Model to Estimate Joint Fire Fratricide." *Military Operations Research Journal*, 17(2), 2012.

Significant Accomplishments

- Distinguished Graduate, (AFIT) 2009

- Dean's Award (AFIT) 2009

Research Interest Areas

- Network optimization
- Game theory

- Algorithm design
- Optimization under uncertainty
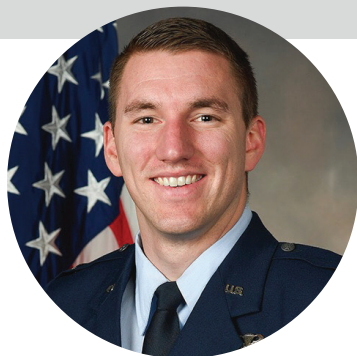
Maj Phillip R. Jenkins

PhD, Operations Research, Air Force Institute of Technology

Assistant Professor of Operations Research

Most Notable Publications

Jenkins, P.R., Caballero, W.N., and Hill, R.R. (2021). "Predicting Success in United States Air Force Pilot Training using Machine Learning Techniques." *Socio-Economic Planning Sciences* (forthcoming, accepted 6 July 2021). DOI: https://doi.org/10.1016/j.seps.2021.101121.

Rao*, A.P, **Jenkins, P.R.**, Vu, D.M., Auxier II, J.D., and Shattan, M.B. (2021). "Rapid quantitative analysis of trace elements in plutonium alloys using a handheld laser-induced breakdown spectroscopy (LIBS) device coupled with chemometrics and machine learning." *Analytical Methods*, 13 (30), 3368-3378. (2021 HOT Article Award Winner) DOI: https://doi.org/10.1039/D1AY00826A.

Caballero, W.N., **Jenkins, P.R.**, and Keith, A.J. (2021). "Poisoning Finite-Horizon Markov Decision Processes at Design Time." *Computers and Operations Research*, 129 (May), 1-17. DOI: https://doi.org/10.1016/j.cor.2020.105185.

Jenkins, P.R., Robbins, M.J., and Lunday, B.J. (2021). "Approximate Dynamic Programming for Military Medical Evacuation Dispatching Policies." *INFORMS Journal on Computing*, 33 (1), 2-26. DOI: https://doi.org/10.1287/ijoc.2019.0930.

Jenkins, P.R., Lunday, B.J., and Robbins, M.J. (2020). "Robust, Multi-Objective Optimization for the Military Medical Evacuation Location-Allocation Problem." *Omega*, 97 (December), 102088, 1-12. DOI: https://doi.org/10.1016/j.omega.2019.07.004.

Selected Honors & Awards

- HOT Article Award, Analytical Methods, 2021

- Innovations in Nuclear Technology Research and Development Award, Department of Energy, 2021

- Outstanding Young Member OR/MS Award, INFORMS Cincinnati-Dayton Chapter, 2020

- General Omar N. Bradley Research Fellowship in Mathematics, United States Military Academy, 2019

- Richard H. Barchi Prize, Military Operations Research Society, 2018

Significant Accomplishments

- Distinguished Graduate, Squadron Officer School 2019

- Distinguished Graduate, M.S. in Operations Research Program (AFIT) 2017

Research Interest Areas

- Dynamic programming
- Approximate dynamic programming
- Markov decision processes
- Stochastic programming
- Machine Learning
- Multi-objective optimization

Dr. Seong-Jong Joo

PhD, Business Administration, Saint Louis University

Professor of Logistics & Supply Chain Management

Most Notable Publications

Joo, S., Min, H., & Smith, C. (2017). "Benchmarking freight rates and procuring cost-attractive transportation services", *The International Journal of Logistics Management*, Vol. 28, No. 1, Pgs. 194-205.
DOI: https://doi.org/10.1108/IJLM-01-2015-0030

Min, H. & **Joo, S.** (2016). "A comparative performance analysis of airline strategic alliances using data envelopment analysis", *Journal of Air Transport Management*, Vol. 52, pgs. 99-110.
DOI: https://doi.org/10.1016/j.jairtraman.2015.12.003

San Nicolas-Rocca, T., Schooley, B., & **Joo, S.** (2014). "Design and development of a patient-centered e-health system to improve patient understanding at discharge", *Communications of the Association for Information Systems*, Vol. 34. DOI: https://doi.org/10.17705/1CAIS.03424

Joo, S. (2009). "Scheduling preventive maintenance for modular designed components: A dynamic approach", *European Journal of Operational Research*, Vol. 192, No. 2, Pgs. 512-520.
DOI: https://doi.org/10.1016/j.ejor.2007.09.033

Selected Honors & Awards

- School of Business Outstanding Professor Award, April 21, 2014
- Enterprise Rent-A-Car Student's Choice Award for Outstanding Faculty Member, May 4, 2012
- School of Business Outstanding Professor Award, April 18, 2012

Research Interest Areas

- Supply chain strategies
- Sourcing
- Inventory management
- Transportation
- Survival/event history analysis
- Performance measurement

Lt Col Phillip M. LaCasse

PhD, Industrial & Manufacturing Engineering, University of Wisconsin, Milwaukee

Assistant Professor of Operations Research

Most Notable Publications

LaCasse, P., Otieno, W., Maturana, F., "Predicting Contact-Without-Connection Defects on Printed Circuit Boards Employing Ball Grid Array Package Types: A Data Analytics Case Study in the Smart Manufacturing Environment," *SN Appl. Sci. 2*, 156 (2020). https://doi.org/10.1007.s42452-019-1924-z

P. LaCasse, W. Otieno, and F. Maturana, "A Survey of Feature Set Reduction Approaches for Predictive Analytics Models in the Connected Manufacturing Enterprise," *Appl. Sci.*, vol. 9, no. 5, p. 843, 2019.

P. M. LaCasse, W. Otieno, and F. P. Maturana, "A hierarchical, fuzzy inference approach to data filtration and feature prioritization in the connected manufacturing enterprise," *J. Big Data*, vol. 5, no. 1, p. 45, Dec. 2018.

LaCasse, P., Otieno, W., Vance, G., Maturana, F., and Cvijetinovic, M., "A Defect Prediction Case Study for Printed Circuit Board Assemblies Containing Ball Grid Array Package Types," *Surface Mount Technology Association (SMTA) International 2019*, Rosemont, IL, 22-26 Sept. 2019.

LaCasse, P., Otieno, W., Maturana, F., "Operationalization of Defect Prediction Case Study in a Holonic Manufacturing System," *9th International Conference on industrial Applications of Holonic and Multi-Agent Systems (HoloMAS)*, 2019, Linz, Austria, Aug. 2019.

Selected Honors & Awards

- 2019 UW-Milwaukee College of Engineering & Applied Sciences Distinguished Student Award

Research Interest Areas

- Operations research
- Applied statistics
- Smart manufacturing
- Machine learning
- Queueing systems

Dr. Brian J. Lunday

PhD, Industrial & Systems Engineering, Virginia Polytechnic Institute and State University

Associate Department Head

Professor of Operations Research

Most Notable Publications

*Caballero, W. N. & **Lunday, B. J.** (2019) "Influence Modeling: Mathematical Programming Representations of Persuasion under Either Risk or Uncertainty." *European Journal of Operational Research*, 278 (1), 266-282. Available online at: https://doi.org/10.1016/j.ejor.2019.04.006.

Lunday, B. J. & Robbins, M. J. (2019) "Collaboratively-developed Vaccine Pricing and Stable Profit Sharing Mechanisms." *Omega*, 84, 102-113. Available online at: https://doi.org/10.1016/j.omega.2018.04.007.

Lessin, A. M., **Lunday, B. J.**, & Hill, R. R. (2018) "A Bilevel Exposure-oriented Sensor Location Problem for Border Security." *Computers and Operations Research*, 98, 56-68. Available online at: https://doi.org/10.1016/j.cor.2018.05.017.

Paul, N. R., **Lunday, B. J.**, & Nurre, S. G. (2017). "A Multiobjective, Maximal Conditional Covering Location Problem applied to the Relocation of Hierarchical Emergency Response Facilities." *Omega*, 66, 147-158. Available online at: http://dx.doi.org/10.1016/j.omega.2016.02.006.

Sherali, H. D., & **Lunday, B. J.** (2013). "On Generating Maximal Nondominated Benders Cuts." *Annals of Operations Research*, 210(1), 57-72. Available online at: http://dx.doi.org/10.1007/s10479-011-0883-6.

Selected Honors & Awards

- Gage H. Crocker Outstanding Professor Award, Wright Memorial Chapter, Air Force Association 2020

- Faculty Excellence Award, Southern Ohio Consortium of Higher Education (SOCHE) 2020

- Professor Ezra Kotcher Award, Wright Memorial Chapter, Air Force Association 2019

- Lessons Learned Senior Civilian Professional of the Year, United States Air Force 2018

- Richard H. Barchi Prize, Military Operations Research Society 2018

Significant Accomplishments

- President Military & Security (MAS) Society, Institute for Operations Research and Management Sciences (INFORMS), 2021-present

- Associate Editor, *Military Operations Research*, 2019-present

Research Interest Areas

- Mathematical optimization
- Bilevel programming
- Game theory
- Location theory
- Network interdiction

Maj Daniel A. Pamplona

PhD, Aeronautical Infrastructure Engineering, Aeronautics Institute of Technology (Brazil)

Assistant Professor of Operations Research

Most Notable Publications

Pamplona, D.A. and Alves, C.J.P., 2020. "An overview of air delay: A case study of the Brazilian scenario." *Transportation Research Interdisciplinary Perspectives*, 7, p.100189.

Pamplona, D.A., Weigang, L., de Barros, A.G., Shiguemori, E.H. and Alves, C.J.P., 2018, July. "Supervised neural network with multilevel input layers for predicting of air traffic delays." *2018 International Joint Conference on Neural Networks (IJCNN)* (pp. 1-6). IEEE.

Ribeiro, V.F., **Pamplona, D.A.**, Fregnani, J.A.T., de Oliveira, Í.R. and Weigang, L., 2016, November. "Modeling the swarm optimization to build effective continuous descent arrival sequences." *2016 IEEE 19th International Conference on Intelligent Transportation Systems (ITSC)* (pp. 760-765). IEEE.

Pamplona, D.A. and Alves, C.J.P., 2020. "Does a fighter pilot live in the danger zone? A risk assessment applied to military aviation." *Transportation research interdisciplinary perspectives*, 5, p.100114.

Selected Honors & Awards

- Best thesis of the Aeronautical Infrastructure Engineering Program – Year 2020

- Michal Gartenkraut Award for Distinction in Transportation Research – Year 2014

- William Grossman Award for Excellence in transportation Research – Year 2014

Research Interest Areas

- Air Transportation
- Flight Safety
- Optimization

- Artificial Intelligence
- Decision Analysis
- Problem Structuring Methods
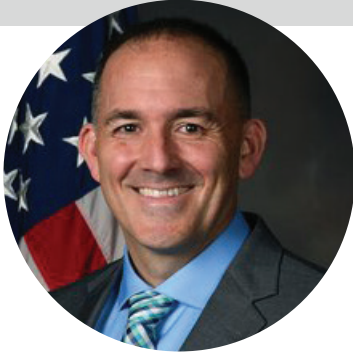
Dr. Adam D. Reiman

PhD, Logistics, Air Force Institute ofTechnology

Assistant Professor of Logistics and Supply Chain Management

Most Notable Publications

Carlson, N. J., **Reiman, A. D.**, Overstreet, R. E., & Douglas, M. A. (2018). "Load planning processes to enhance cargo compartment utilization." *Journal of Defense Analytics and Logistics*, 1(2), 137-150.

Maywald, J. D., **Reiman, A. D.**, Overstreet, R. E., Johnson, A. W. (2018) "Aircraft selection modeling: a multi-step heuristic to enumerate airlift alternatives." *Annals of Operations Research*, 1-21.

Maywald, J., **Reiman, A.**, Johnson A. & Overstreet, R. (2017). "The myth of strategic and tactical airlift." *Air and Space Power Journal*.

Reiman, A. D. (2014). "Enterprise analysis of strategic airlift to obtain competitive advantage through fuel efficiency." *Air Force Institute of Technology School of Engineering and Management*.

Reiman, A., Main, B. & Anderson, B. (2013). "Enhancing airlift fuel efficiency through increased utilization of cargo capacity." *The Journal of Defense Modeling and Simulation: Applications, Methodology, Technology*, 12(1), 19-29.

Research Interest Areas

- Logistics Management
- Airlift: Metrics, Routing, Scheduling, Fuel Efficiency
- Energy: Efficiency, Supply and Demand
- Value Focused Thinking
- Heuristic Search Algorithms

Dr. Matthew JD Robbins

PhD, Industrial Engineering, University of Illinois

Associate Professor of Operations Research

Most Notable Publications

Rettke, A.J., **Robbins, M.J.**, and Lunday, B.J., 2016. "Approximate Dynamic Programming for the Dispatch of Military Medical Evacuation Assets," *European Journal of Operational Research*, 254 (3), 824-839.
DOI: https://doi.org/10.1016/j.ejor.2016.04.017.

Robbins, M.J., Jenkins, P.R., Bastian, N.D., and Lunday, B.J., 2018. "Approximate Dynamic Programming for the Aeromedical Dispatching Problem: Value Function Approximation Utilizing Multiple Level Aggregation," *Omega* (forthcoming, accepted 19 Dec 18). (MORS 2018 Barchi Prize Winning Paper.)
DOI: https://doi.org/10.1016/j.omega.2018.12.009.

Widrick, R.S., Nurre, S.G., and **Robbins, M.J.**, 2018. "Optimal Policies for the Management of an Electric Vehicle Battery Swap Station," *Transportation Science*, 52 (1), 59-79.
DOI: https://doi.org/10.1287/trsc.2016.0676.

Nystrom, J.K., **Robbins, M.J.**, Deckro, R.F., and Morris, J.F., 2018. "Simulating Attacker and Defender Strategies within a Dynamic Game on Network Topology," *Journal of Simulation*, 12 (4), 307-331. DOI: https://doi.org/10.1057/s41273-017-0054-0.

Davis, M.T., **Robbins, M.J.**, and Lunday, B.J., 2017. "Approximate Dynamic Programming for Missile Defense Interceptor Fire Control," *European Journal of Operational Research*, 259 (3), 873-886. DOI: https://doi.org/10.1016/j.ejor.2016.11.023.

Selected Honors & Awards

- Richard H. Barchi Prize (Military Operations Research Society) 2018

- Outstanding Young Member Award (INFORMS, Cincinnati-Dayton Chapter) 2014

- Pritsker Doctoral Dissertation Award – First Place (Institute of Industrial Engineers) 2011

Significant Accomplishments

- Associate Editor, Military Operations Research (2019-present)

- Associate Editor, Naval Research Logistics (2019-present)

- President, INFORMS Cincinnati-Dayton Chapter (2019)

- Vice-President, INFORMS Cincinnati-Dayton Chapter (2018)

- Elected Council Member, INFORMS Military and Security Society (2019-2020)

Research Interest Areas

Computational stochastic optimization – the design, development, and testing of approximate dynamic programming and reinforcement learning algorithms that utilize simulation, mathematical programming, and machine learning techniques to solve large-scale sequential decision-making problems under uncertainty; application areas include the dispatch of military medical evacuation assets, the routing of military distribution assets, and the battle management of mobile, autonomous systems.
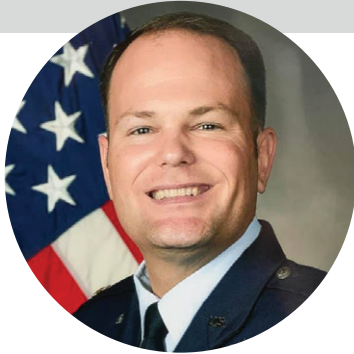
Lt Col Matthew D. Roberts

PhD, Logistics, Air Force Institute of Technology

Assistant Professor of Logistics and Supply Chain Management

Most Notable Publications

Douglas, M., Swartz, S., Richey, R., & **Roberts, M.** (2019), "Risky business: Investigating influences on large truck drivers' safety attitudes and intentions," *Journal of Safety Research*, Volume 70, pp 1-11.

Roberts, M., Douglas, M., Overstreet, R., Ogden, J., & Kabban, C. (2018), "Development and validation of a multi-level air freight handling safety climate scale," *Transportation Research Part F: Traffic Psychology and Behaviour*, Volume 59, pp 445-462.

Swartz, S., **Douglas, M.**, Roberts, M., & Overstreet, R. (2017), "Leavin' on my mind: Influence of safety climate on truck drivers' job attitudes and intentions to leave," *Transportation Journal*, Volume 56, Issue 2, pp. 184-209.

Roberts, M. & Hazen, B. (2016), "Big data for omni-channel supply chain management: the need for greater focus on people and process," *International Journal of Automation and Logistics*, Volume 2, Issue 4, pp. 271-278.

Selected Honors & Awards

- Outstanding Reviewer Award, Midwest Academy of Management 58th Annual Meeting, 2015

- Distinguished Graduate, Advanced Logistics Readiness Officer Course, 2014

- Distinguished Graduate, Squadron Officer School, 2013

- Distinguished Graduate, Air Force Institute of Technology, 2013

- Top Graduate, Logistics Readiness Officer Basic Course, 2007

- Distinguished Graduate, Officer Training School, 2006

Significant Accomplishments

- Member of Council of Supply Chain Management Professionals (2017 – Present)

- Member of Logistics Officer Association (2006 – Present)

Research Interest Areas

- Operational Safety
- Organizational Leadership and Climate
- Supply Chain Resilience

Lt Col Jesse G. Wales

PhD, Operations Research with Engineering, Colorado School of Mines

Assistant Professor of Operations Research

Most Notable Publications

Wales, J. G., Zolan, A. J., Newmans, A. M., & Wagner, M. J. (2021). "Optimizing Vehicle Fleet and Assignment for Concentrating Solar Power Plant Heliostat Washing." *IISE Transactions*, (just-accepted), 1-29.

Wales, J. G., & Marasco, P. L. (2006, May). "Statistical assessment of night vision goggle noise." In *Helmet-and Head-Mounted Displays XI: Technologies and Applications* (Vol. 6224, p. 62240I). International Society for Optics and Photonics.

Wales, J. G., & Marasco, P. L. (2005, May). "Assessment of an optically stimulated infrared emission from image intensifier tube photocathodes." In *Helmet-and Head-Mounted Displays X: Technologies and Applications* (Vol. 5800, pp. 177-186). International Society for Optics and Photonics.

Selected Honors & Awards

- Field Grade Officer of the Year, Air Force Inspection Agency, 2014

- Operations Research Honor Graduate, Air Force Institute of Technology, 2014

- Air Force Company Grade Analyst of the Year Honorable Mention, 2011

- Company Grade Officer of the Year, Det. 4, AF Operational Test and Evaluation Center, 2010

- Top Third Graduate, Squadron Officer School, 2008

Research Interest Areas

- Deterministic optimization
- Large-scale systems optimization
- Renewable energy systems

Dr. Michael R. Grimaila, CISM, CISSP

PhD, Computer Engineering, Texas A&M University

Department Head, Systems Engineering & Management

Professor of Systems Engineering

Most Notable Publications

Okolica, J.S., Peterson, G., Mills, R.F., and **Grimaila, M.R.**, "Sequence Pattern Mining with Variables," *IEEE Transactions on Knowledge and Data Engineering*, pp. 1-20, 19 November 2018, DOI: 10.1109/TKDE.2018.2881675.

Hodson, D.D., **Grimaila, M.R.**, Mailloux, L.O., Grimaila, M.R., McLaughlin, C.V., & Baumgartner, G.B., "Modeling quantum optics for quantum key distribution system simulation," *The Journal of Defense Modeling and Simulation: Applications, Methodology, Technology*, January 12, 2017, DOI: 10.1177/1548512916684561, pp. 1-12.

Mailloux, L.O., **Grimaila, M.R.**, Hodson, D.D., McLaughlin, C., & Baumgartner, G., "Modeling, simulation, and performance analysis of decoy state enabled quantum key distribution systems," *Applied Sciences*, 2017, 7(2), 212.

Johnson, J., **Grimaila, M.R.**, Humphries, J., and Baumgartner, G., "An Analysis of Error Reconciliation Protocols used in Quantum Key Distribution Systems," *Journal of Defense Modeling and Simulation: Applications, Methodology, Technology,* Sage Press, DOI: 10.1177/1548512913503418, pp. 1-11, September 2013.

Grimaila, M.R., Myers, J., Mills, R.F., and Peterson, G., "Design and Analysis of a Dynamically Configured Log-based Distributed Security Event Detection Methodology," *The Journal of Defense Modeling and Simulation: Applications, Methodology, Technology*, Sage Press, DOI: 10.1177/1548512911399303, Vol. 9(3), pp. 219-241, 2012.

Selected Honors & Awards

- AFIT Board of Visitors Colonel Charles Stone Award (2012)

- Fellow of the Information System Security Association (2011)

- Senior Member IEEE (2005)

Significant Accomplishments

- Corresponding Editor, *Journal of Defense Modeling and Simulation*, 2018-Present

- Editorial Board of *Information System Security Association (ISSA) Journal*, 2003-Present

- Assistant Editor, *The Defense Cyber Review*, Army Cyber Institute, West Point, 2016-Present

Research Interest Areas

- Civil Defense / CBRNE Response
- Computer and Network Security
- Quantum Networking
- Modeling and Simulation
- Systems Engineering

Lt Col Paul M. Beach

PhD, Systems Engineering, Air Force Institute of Technology

Assistant Professor of Systems Engineering

Most Notable Publications

Beach, P.M., (2020). "A Methodology to Identify Alternative Suitable NoSQL Data Models via Observation of Relational Database Interactions." *(Doctoral dissertation)*. Air Force Institute of Technology, Wright-Patterson Air Force Base, Ohio.

Beach, P. M., Langhals, B. T., Grimaila, M. R., Hodson, D. D., & Engle, R. D. (2019). "Developing a Methodology for the Identification of Alternative NoSQL Data Models via Observation of Relational Database Usage." In P*roceedings of the International Conference on Information and Knowledge Engineering (IKE)* (pp. 39-44). *The Steering Committee of The World Congress in Computer Science, Computer Engineering and Applied Computing (WorldComp)*.

Beach, Paul M., Logan O. Mailloux, Brent T. Langhals, and Robert F. Mills. "Analysis of Systems Security Engineering Design Principles for the Development of Secure and Resilient Systems." *IEEE Access* 7 (2019): 101741-101757.

Beach, P. M., Mills, R. F., Burfeind, B. C., Langhals, B. T., & Mailloux, L. O. (2018). "A STAMP-based approach to developing quantifiable measures of resilience." In *Proceedings of the International Conference on Embedded Systems, Cyber-physical Systems, and Applications (ESCS)* (pp. 103-109). *The Steering Committee of The World Congress in Computer Science, Computer Engineering and Applied Computing (WorldComp)*.

Mailloux, L. O., **Beach, P. M.**, & Span, M. T. (2018, April). "Examination of security design principles from NIST SP 800-160." In *2018 Annual IEEE International Systems Conference (SysCon)* (pp. 1-8). IEEE.

Selected Honors & Awards

- Honor Societies: Tau Beta Pi, Eta Kappa Nu

- Meritorious Service Medal

- Joint Service Commendation Medal

- Air Force Commendation Medal with Oak Leaf Cluster

- Air Force Achievement Medal

- Army Achievement Medal

- Distinguished Graduate, Intermediate Network Warfare Training (2012)

Research Interest Areas

- Systems Security Engineering
- Systems Software Engineering
- Cybersecurity
- Data analytics
- Databases

Dr. Christopher M. Chini

PhD, Civil Engineering, University of Illinois at Urbana-Champaign

Assistant Professor of Engineering Management

Most Notable Publications

Chini, C.M., Djehdian, L.A., Lubega, W.N., and Stillwell, A.S. (2018). "Virtual Water Transfers of the U.S. Electric Grid." *Nature Energy*, 3, 1115-1123.
DOI: 10.1038/s41560-018-0266-1.

Delorit, J.D., Schuldt, S.J, and **Chini, C.M.** (2020). "Evaluating an Adaptive Management Strategy for Organizational Energy Use under Climate Uncertainty." *Energy Policy*, 142, 111547.
DOI: 10.1016/j.enpol.2020.111547.

Chini, C.M. and Stillwell, A.S. (2017). "The State of U.S. Urban Water: Data and the Energy-Water Nexus." *Water Resources Research*, 54(3) 1796-1811.
DOI: 10.1002/2017WR022265.

Siddik, M., C**hini, C.M.**, and Marston, L.M. (2020). "Urban water and carbon footprints of electricity are sensitive to geographical attribution method." *Environmental Science & Technology*, 54(12), 7533-7541.
DOI: 10.1021/acs/est.0c00176.

Peer, R.A.M. and **Chini, C.M.** (2020). "An Integrated Assessment of the Global Virtual Water Trade Network of Energy." *Environmental Research Letters*.
DOI: 10.1088/1743-9326/abbbb0.

Selected Honors & Awards

- Editor's Choice Award Article for Journal of Sustainable Water and the Built Environment Vol 6, Issue 3, 2020

- Water Reousrces Research Top Dowloaded Paper of 2018-2019 Award, 2020

- UCOWR Ph.D. Dissertation Award in Water Policy and Socio-Economics, 2019

- National Science Foundation Graduate Research Fellowship, 2015

- Department of the Army Achievement Medal for Civilian Service, 2013

Research Interest Areas

- Water resources systems
- Energy-water nexus
- Climate change and infrastructure
- Energy resilience
- Water resilience
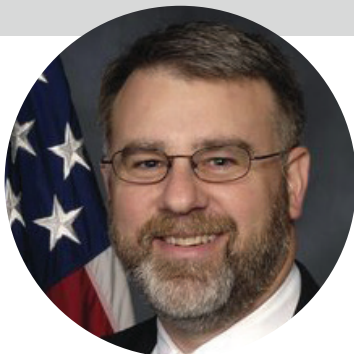
Dr. John M. Colombi

PhD, Electrical Engineering, Air Force Institute of Technology

Professor of Systems Engineering

Most Notable Publications

Author or coauthor on over 100 publications

Colombi, J., Buckle, L., Black, J., and S. Nurre (2017). "Optimal Launch Manifesting for Heterogeneous Disaggregated Satellite Constellations," *Journal of Spacecraft and Rockets*, Vol. 54, No. 3 (2017), pp. 582-591. https://doi.org/10.2514/1.A33796

Colombi, J., Robbins, M., Burger[#] J. & Weber[E], Y. (2015). "Interface evaluation for open system architectures using multiobjective decision analysis." *Military Operations Research (MOR) Journal* 20(2):55-69.

Hardman, N., Jacques, D. R., **Colombi, J. M.**, Hill[F], R., & Miller[E], J. (2013). "Requirements elicitation through legacy mishap analysis," American institute of aeronautics and astronautics (AIAA) *Journal of Aerospace Information Systems*, 10(3), 105-113.

Ford[#], T. C., **Colombi, J. M.**, Jacques[F], D. R., & Graham[F], S. R. (2009). "A general method of measuring interoperability and describing its impact on operational effectiveness." *Journal of Defense Modeling and Simulation: Applications, Methodology, Technology*, 6(1), 17-32.

Thompson[#], R., **Colombi, J.**, Black[F] J. and B. Ayres[F] (2015). "Disaggregated Space System Concept Optimization: Model-Based Conceptual Design Methods," *Journal of Systems Engineering* (18) 6, pp 549–675.

Selected Honors & Awards

- 2019: Primary advisor for 173 students on 109 projects; Committee member on 129 more students
- 2019: AFIT Leadership Award – Senior Faculty
- 2018: Senior Member, IEEE
- 2017: ABET Program Evaluator for Systems Engineering
- 2017: Best Paper, IEEE Systems Conference, Montreal, Canada, 24-27 April 2017
- 2015: Southwest Ohio Council for Higher Education (SOCHE) Faculty Excellence Award
- 2015: Department Best Teacher Award; 2012, 2011 Department Educator of the Year
- 2011: Ohio Magazine Excellence in Education

Significant Accomplishments

Served 21 years active duty in the US Air Force (retired Lt Col) as a Developmental Engineer, taking a variety of research, engineering and management assignments, including:
- Program Manager, Command and Control (C2) Enterprise;
- Chief Engineer, Airborne Warning and Control System (AWACS) Systems;
- Chief, AWACS Command and Control Programs Integrated Product Team;
- Chief, Defensive Information Operations Research Team, National Security Agency; and
- Communication Systems Engineer, Rome Laboratories

Research Interest Areas

- Model-based Systems Engineering (MBSE) for conceptual trade space exploration
- Autonomous aircraft design and test
- Complex adaptive systems
- Acquisition research
- Human systems integration

DEPARTMENT OF SYSTEMS ENGINEERING & MANAGEMENT

Maj Warren J. Connell

PhD, Information Technology, George Mason University

Assistant Professor of Systems Engineering

Most Notable Publications

Connell, Warren, Albanese, Massimiliano, and Sridhar Venkatesan. "A Framework for Moving Target Defense Quantification." *IFIP International Information Security and Privacy Conference*. Springer International Publishing, 2017.

Connell, Warren, Menascé , Daniel, and Massimiliano Albanese. "Performance Modeling of Moving Target Defenses." *Fourth ACM Workshop on Moving Target Defense (MTD)*. ACM, 2017.

Connell, Warren, Luan Pham, and Sam Philip. "Analysis of Concurrent Moving Target Defenses." *Fifth ACM Workshop on Moving Target Defense (MTD)*. ACM, 2018.

Connell, Warren, Menascé , Daniel, and Massimiliano Albanese. "Performance Modeling of Moving Target Defenses with Reconfiguration Limits." *IEEE Transactions on Dependable and Secure Computing*. IEEE Early Access, 2018.

Selected Honors & Awards

- National System for Geospatial Intelligence Company Grade Officer of the Year, 2010

- 3-time F-35 Test Directorate Senior Officer of the Quarter, between 2019-2020

Significant Accomplishments

- Certified Information System Security Professional, 2013-present

- First-ever Cyber Test Lead for the F-35 Joint Program Office, 2020

Research Interest Areas

- Cyber Moving Target Defenses
- Autonomous Computing

- Aircraft Cyber Testing
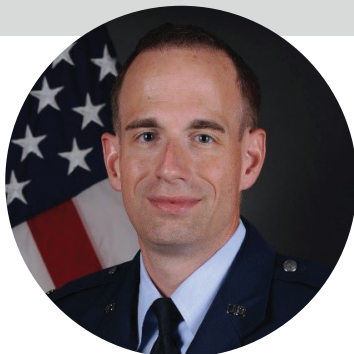
Lt Col Casey W. Cooper

PhD, University of Oklahoma Health Sciences Center

Assistant Professor of Industrial Hygiene

Most Notable Publications

Cooper, C., Aithinne, K., Floyd, E. Johnson, D. (2019) "A Comparison of Air Sampling Methods for Clostridium difficile Endospore Aerosol." *Aerobiologia*, 35(3): 411-420.

Aithinne, K., **Cooper C.**, Lynch, R., Johnson, D. (2018) "Toilet Plume Aerosol Generation Rate and Environmental Contamination Following Bowl Water Inoculation with Clostridium difficile spore." *American Journal of Infection Control*, 47(5): 515-520.

Cooper, C., Slagley, J., Lohaus J., Escamilla, E., Bliss, C., Semler, D., Felker, D., Smith, D., Ott, D. (2014) "Comparison of High-Volume Air Sampling Equipment for Viral Aerosol Sampling During Emergency Response." *Journal of Emergency Management*, 12(2): 161-170.

Selected Honors & Awards

- Meritorious Service Medal, 2016

- Air Mobility Command, Biomedical Specialist of the Year, 2014

- 19th Medical Group Field Grade Officer of the Year, 2014

- Afghanistan Campaign Medal, 2014

Research Interest Areas

- Biodefense
- CBRN Countermeasures
- Bioaerosols

- Healthcare Acquired Infections
- Environmental Health
- Occupational Health

Lt Col Amy M. Cox

PhD, Systems Engineering, The George Washington University

Assistant Professor of Systems Engineering

Most Notable Publications

Flenar, Wagner, **Cox** and Jacques, "Determining Detectable and Exploitable Aspects of Rogue Small Unmanned Aircraft Systems". *Journal of DoD Research and Engineering* (accepted in 2019).

Selected Honors & Awards

- 2015: Merrit Willamson Best Conference Paper Award, American Society for Engineering Management

- 2012: Outstanding Air Force Program Manager, ACAT III or Equivalent

- 2011: Joint Service Achievement Medal, Achievement

- 2005: Distinguished Graduate, Defense Language Institute (French)

Significant Accomplishments

- Developed prototype degree program for Acquisitions Managers; first two Systems Management students graduated in March 2019

- Brevet, Flight Test Engineer, École du Personnel Navigant d'Essais et de Réception, Istres, FR, Specialization in Rotary Wing Aircraft, July 2006

Research Interest Areas

- User Innovation
- Innovation Portfolio Performance
- System Design and Architecture
- Social Network Analysis
- UAV Flight Test and Performance

Lt Col Justin D. Delorit, P.E.

PhD, Civil and Environmental Engineering, University of Wisconsin-Madison

Assistant Professor of Engineering Management

Most Notable Publications

Delorit, J., Parker, D., and Block, P., "An agro-economic approach to framing perennial farm-scale water resource management for water rights markets," *Agricultural Water Management*, 218:68-81, 2019.
DOI: https://doi.org/10.1016/j.agwat.2019.03.029

Delorit, J. and Block, P., "Water market-scale forecast-informed option contracts." *Journal of Water Resources Planning and Management*, Volume 125, Issue 5, 2019
DOI: https://10.1061/(ASCE)WR.1943-5452.0001068

Delorit, J. and Block, P., "Promoting competitive water resource use efficiency at the water-market scale: An inter-cooperative demand equilibrium-based approach to water trading." *Water Resources Research*, 54(8), 5394-5421, 2018
DOI: https://doi.org/10.1029/2017WR022323

Delorit, J., Gonzalez Ortuya, E. and Block, P., "Evaluation of Model-Based Seasonal Streamflow and Water Allocation Forecasts for the Elqui Valley, Chile." *Hydrol. Earth Syst. Sci.* 21(9): 4711–4725., 2017
DOI: https://doi.org/10.5194/hess-21-4711-2017

Delorit, J., Racz L., "Evaluation of Activated Sludge for Biodegradation of Propylene Glycol as an Aircraft Deicing Fluid," *Water Environment Research*, Volume 86, Number 4, April 2014, pp. 366-371(6)

Selected Honors & Awards

- Dean's Distinguished Teaching Faculty, 2020

- USAF Major General Dean L. Fox Senior Military Manager Award, 2019

- Best Reviewer, Journal of Water Resources Planning and Management, 2018

- Air Force Arthur S. Flemming Award for Basic Science, 2018

- Federal Engineer of the Year, 2018

- University of Wisconsin James R. Villemonte Excellence in Research, 2018

Research Interest Areas

- Resilient Installations
- Climate change adaptation policy
- Energy-use and economic modelling
- Climate forecasting
- Coupled human-natural systems
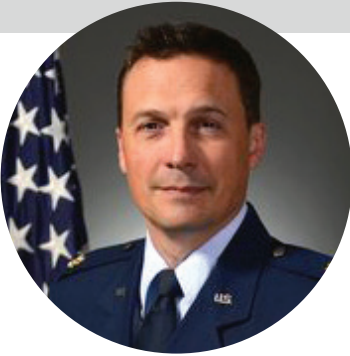
Lt Col Scott T. Drylie

PhD, Economics, George Mason University

Cost Analysis Program Chair

Research Interest Areas

- Economics of Institutions and Constitutions

- History of Thought

- Incentives, Information, and Coordination Issues

- Industrial Psychology

- Game Theory
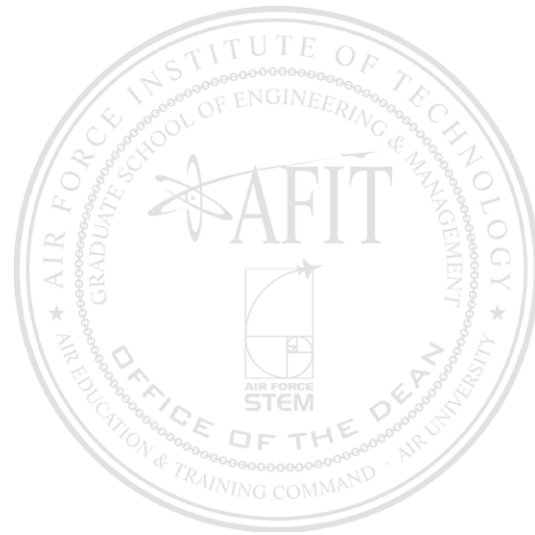
Dr. John J. Elshaw

PhD, Management, Purdue University

Associate Professor of Management

Most Notable Publications

Kim, Sungbin, Miller, Michael E., Rusnock, Christina F., & **Elshaw, John J.** (2018). "Spatialized audio improves call sign recognition during multi-aircraft control". *Applied Ergonomics*, 70, pp. 51-58.

Gay, C., Horowitz, B., **Elshaw, J.**, Bobko, P., & Kim, I. (2017). "Operator suspicion and decision responses to cyber-attacks on unmanned ground vehicle systems". *Proceedings of the Human Factors and Ergonomics Society*, Vol 61, Issue 1, pp. 226-230.

Elshaw, John J., Badiru, Adedeji B., & Harris, Sharif F. (2017). "Learning curve analysis in department of defense acquisition programs". *Acquisition Research Program: Creating Synergy for Informed Change* (online publication), 22 November 2017, Naval Postgraduate School.

Elshaw, John J., Fass, Robert D., & Mauntel, Brian R. (2017). "Cognitive Mentorship: Protégé Behavior as a Mediator to Performance". *Journal of Mentoring and Teaching* (In Print).

Elshaw, J. J. "Social Science Measurement (2016)". *Handbook of Measurements: Benchmarks for Systems Accuracy and Precision*, Badiru editions, Taylor and Francis.

Research Interest Areas

- Leadership, Human-Technology interaction (virtual teams, electronic monitoring, distance leadership)

- Learning curves and the impact on acquisition

- Workgroup and team processes within organizations, social networks, organizational climate and culture

- Cross-cultural leadership and communication

- Cognition and emotions

- Motivation (self-regulation, intrinsic versus extrinsic control)

- Human performance

- Organizational trust, performance, and commitment

Maj Ryan D. L. Engle

PhD, Systems Engineering, Air Force Institute of Technology

Assistant Professor of Systems Engineering

Most Notable Publications

Engle, R.D.L. (2018). "A Methodology for Evaluating Relational and NoSQL Databases for Small-Scale Applications." (*Doctoral dissertation*). Air Force Institute of Technology, Wright-Patterson Air Force Base, Ohio.

Engle, R.D., Mailloux, L. O., Grimaila, M. R., Hodson, D. D., McLaughlin, C. V., Baumgartner, G. (2019). "Implementing the decoy state protocol in a practically oriented quantum key distribution system-level model." *The Journal of Defense Modeling and Simulation*. 16(1). 27-44.

Engle, R. D., Hodson, D. D., Mailloux, L. O., Grimaila, M. R., McLaughlin, C. V., & Baumgartner, G. (2019). "A module-based simulation framework to facilitate the modeling of quantum key distribution system post-processing functionalities." *The Journal of Defense Modeling and Simulation*, 16(1), 45-56.

Engle, R. D., Langhals, B. T., Grimaila, M. R., and Hodson, D. D. "Evaluation criteria for selecting (2018). NoSQL databases in a single box environment." *International Journal of Database Management Systems*, 10(4).

Engle, R.D., Langhals, B. T., Grimaila, M. R., and Hodson, D. D. (2018). "The case for NoSQL on a single desktop." *Proceedings of the International Conference on Information and Knowledge Engineering (IKE).* The Steering Committee of the World Congress in Computer Science, Computer Engineering and Applied Computing (WorldComp).

Selected Honors & Awards

- Tau Beta Pi Engineering Honor Society

- Air Force Commendation Medal with three oak leaf clusters

- Air Force Achievement Medal with one oak leaf cluster

- Afghanistan Campaign Medal with one bronze star

- Global War on Terrorism Medal

- Air and Space Campaign Medal with one bronze star

Research Interest Areas

- Data storage and retrieval systems
- Databases
- Data analytics
- Cyber security

- Modeling and simulation
- Quantum-based communications
- Software-defined radio applications

Dr. Robert David Fass

PhD, Business Administration, New Mexico State University

Assistant Professor of Systems Integration and Cost Analysis

Most Notable Publications

Griffith, J., White, E., **Fass, R.**, & Lucas, B. (2018). "Comparison of Body Composition Metrics for United States Air Force Airmen". *Military Medicine*, 183(3-4), e201-e207.

Elshaw, J., **Fass, R.**, Mauntel, B. (2018). "Cognitive Mentorship: Protégé Behavior as a Mediator to Performance". *Mentoring & Tutoring: Partnership in Learning*. DOI: 10.1080/13611267.2018.1511951

McGowin, A., Ritschel, J., **Fass, R.**, & Boehmke, B. (2018). "A Text Mining Analysis of Acquisition Reforms and Expert Views," *Defense Acquisition Research Journal*, 25(3), 288-323.

Rosson, J., Rice, M., Lopez, Jr., J., **Fass, R.** (2018). "Incentivizing Cyber Security Investment in the Power Sector Using an Extended Cyber Insurance Framework", To appear in: *Homeland Security Affairs*. (Accepted: May 2018)

Selected Honors & Awards

- Certified Cost Estimator/Analyst, 2015 (International Cost Estimating & Analysis Association, Certificate # 2875)

- Phi Beta Kappa, 1989

Significant Accomplishments

- Delivers graduate education supported by 20-year military career (ret, Lt Col) as a warranted Contracting Officer (64P) in Defense Acquisition

- Thesis chair/committee member on over 50 defense acquisition related research projects since 2008

- Enhanced quantitative rigor of cost program curriculum with existing course enhancements and new courses

Research Interest Areas

Cost Analysis, Decision Making, Risk Analysis, Defense Acquisition System Processes and Policies, Leadership, Organizational Behavior, Organizational Change and Development, Organizational Culture, Motivation, Performance Measurement, Business Strategy, Strategic Alliances, Psychometric Research Methods, Qualitative Research Methods, Inductive Theory Building, Theory Application & Testing, Structural Equation Modeling, Social Network Analysis, Learning Modalities

Dr. Thomas C. Ford

PhD, Systems Engineering, Air Force Institute of Technology

Assistant Professor of Systems Engineering

Most Notable Publications

Thomas C. Ford, John M. Colombi, David R. Jacques and Scott R. Graham, "A General Method of Measuring Interoperability and Describing Its Impact on Operational Effectiveness," *Journal of Defense Modeling and Simulation*. January 1, 2009, 6:17-32. (Invited Paper)

Thomas C. Ford, John M. Colombi, David R. Jacques and Scott R. Graham. "On the Application of Classification Concepts to Systems Engineering Design and Evaluation," *Journal of Systems Engineering*. Vol 12, No. 2, 2009.

Christos Chalyvidis, Jeffrey Ogden, Alan Johnson, John Colombi, **Thomas Ford**. "A Method for Measuring Supply Chain Interoperability," *Supply Chain Forum*. Vol 17, Issue 4, 2016.

Thomas C. Ford, David W. Meyer, John M. Colombi, Brian K. Scheller, Cody G. Palmer. "A Method for Assessing the Time-Variant Value of Multi-Domain Architectures," *Journal of Defense Modeling and Simulation*. Published on-line June 29, 2016.

Torrey Wagner, **Thomas C. Ford**. "DoD Applications of Agile Software Development Methods," *Journal of Defense Research and Engineering*. (Accepted for Publication)

Selected Honors & Awards

- Certified SAFe Agilist (2018), Object Management Group Certified Systems Modeler – Model User (2017), NRO Silver Medal (2012)

Significant Accomplishments

- Delivers graduate education supported by 22-year military career (ret, Lt Col) as Developmental Engineer (62E) in Defense Acquisition

- Teaches online Systems Engineering Masters courses to military and civilian, current and future, Lead- and Chief-Engineers as well as Operators throughout CONUS and OCONUS

- Served on committee for two PhD students, advised or served on committee for 13 MS students performing Air Force-focused research

- Re-designed and modernized SENG520 Systems Engineering Design

Research Interest Areas

- Model-based Systems Engineering (MBSE)
- System Interoperability
- Modeling and Simulation Systems Design & Modeling
- Agile Software Systems Engineering

Lt Col Jeremy R. Geiger

PhD, Systems Engineering, Air Force Institute of Technology

Assistant Professor of Systems Engineering

Distance Learning Program Director

Selected Honors & Awards

- 2010: Defense Meritorious Service Medal

- 2017: Meritorious Service Medal

- 2017: Aerial Achievement Medal with 2 Oak Leaf Clusters

- 2017: Field Grade Officer of the Year, 418 FLTS

Significant Accomplishments

- 2010: Deployed to Afghanistan in Operation Enduring Freedom

- 2013: United States Air Force Test Pilot School, Class 13A

Research Interest Areas

- Organizational Behavior
- Measure Development
- Verification & Validation

- Flight Test & Evaluation
- Business Processes & Efficiency
- Innovation

Dr. Mark N. Goltz

PhD, Environmental Engineering and Science, Stanford University

Distinguished Professor Emeritus of Environmental Engineering and Science

Most Notable Publications

Kanel, S. R., H. Misak, D. Nepal, S. Mall, S.W. Brittle, I.E. Sizemore, D. Kempisty, **M.N. Goltz**, "Application of Carbon Nanotube Yarns as a Filter Media to Treat Nitroaromatic-contaminated Water", accepted *New Carbon Materials*, 2015.

Huang, J., J.A. Christ, **M.N. Goltz**, and A.H. Demond, "Modeling NAPL Dissolution from Pendular Rings in Idealized Porous Media", *Water Resources Research*, 51, DOI: 10.1002/2015WR016924, 2015.

Huang, J. and **M.N. Goltz**, "Semi-Analytical Solutions for Transport in Aquifer and Fractured Clay Matrix System", *Water Resources Research*, 51, 7218-7237, DOI: 10.1002/2014WR 016073, 2015.

Kanel, S. R., J. Flory J., A. Meyerhoefer, J.L. Fraley, I.E. Sizemore, and **M.N. Goltz**, "Influence of Natural Organic Matter on Fate and Transport of Silver Nanoparticles in Saturated Porous Media: Laboratory Experiments and Modeling", *Journal of Nanoparticle Research*, 17(3):1-13, 2015.

Powell, C.L., **M.N. Goltz**, and A. Agrawal, "Degradation Kinetics of Chlorinated Aliphatic Hydrocarbons by Methane Oxidizers Naturally-Associated with Wetland Plant Roots", *Journal of Contaminant Hydrology*, 170: 68-75, 2014.

Selected Honors & Awards

- AFIT Distinguished Professor, 2015

- AFIT Graduate School of Engineering and Management Charles P. Brothers Outstanding Volunteer Service Award, 2014

- Fellow, Society of American Military Engineers, 2009

Research Interest Areas

Groundwater contamination remediation technologies, Fate and transport of organic contaminants in the subsurface, Stimulating commercialization of environmental remediation technologies, Mathematical modeling of contaminant transport by groundwater, In situ bioremediation of chlorinated organic compounds in the subsurface, Scaling-up from the laboratory to the field, Physical and chemical water and wastewater treatment technologies, and Environmental modeling.

Dr. Willie F. Harper Jr.

PhD, Civil and Environmental Engineering, University of California, Berkeley

Professor of Environmental Engineering and Science

Most Notable Publications

Brandon M. Stewart, Michael E. Miller, David M. Kempisty, John Stubbs, and **Willie F. Harper, Jr.** (2018). "Oxidation of Tartrazine with ultraviolet light emitting diodes: pH and duty cycles effects", *Water Science and Technology*, Vol 77 (3), 1651-1659.

Willie F. Harper, Jr., William Flemings, Kandace Bailey, Walter Lee, Daniel Felker, Vicente Gallardo, Matthew Magnuson, and Rebecca Phillips (2017). "Adsorption of malathion onto copper and iron surfaces relevant to water infrastructure". *Journal of American Water Works Association*, Vol 109 (11), E494-E502.

Akihiko Terada, Sho Sugawara, Keisuke Hojo, Yuki Takeuchi, Shohei Riya, **Willie F. Harper Jr.**, Tomoko Yamamoto, Megumi Kuroiwa, Kazuo Isobe, Chie Katsuyama, Yuichi Suwa, Keisuke Koba, and Masaaki Hosomi (2017). "Hybrid nitrous oxide production from partial nitrifying bioreactor: hydroxylamine interactions with nitrite". *Environmental Science and Technology*, Vol. 51(5), 2748-2756.

Robert Scott, Patrick Mudimbi, Michael E. Miller, Matthew Magnuson, Stuart Willison, Rebecca Phillips, **Willie F. Harper, Jr.** (2017). "Advanced oxidation of tartrazine and brilliant blue with pulsed ultraviolet light emitting diodes". *Water Environment Research*, Vol. 89, 24-31.

Daniel Baseley, Luke Wunderlich, Grady Phillips, Kevin Gross, Glen Perram, Stuart Willison, Rebecca Phillips, Matthew Magnuson, Sang Don Lee, **Willie F. Harper, Jr.** (2016). "Hyperspectral analysis for standoff detection of dimethyl methylphosphonate on building materials", *Building and Environment*, Vol. 108, 135-142.

Selected Honors & Awards

- Embassy Science Fellow (Togo), 2017-2018

- John L. McLucas Basic Research Award, 2016

Research Interest Areas

- Water quality, including biological and chemical treatment methods

Dr. David R. Jacques

PhD, Aeronautical Engineering, Air Force Institute of Technology

Professor of Systems Engineering

Most Notable Publications

Vandawaker, R.M., **D. Jacques**, E. Ryan, J. Huscroft and J. Freels. "Health Monitoring Impact on Non-Repairable Component Supply Methods", *Journal of Quality in Maintenance Engineering*, 23 (1), 82-94, 2016.

Humphreys, C., R. Cobb, **D. Jacques** and J. Reeger, "A Hybrid Optimization Technique Applied to the Intermediate-Target Optimal Control Problem", *Global Journal of Technology and Optimization*, Vol. 7, Issue 2, August, 2016.

Vandawaker, R.M., **Jacques, D.R.**, Freels, J.K., "Impact of Prognostic Uncertainty in System Health Monitoring", *International Journal of Prognostic Health Management*, ISSN 2153-2648, 2015 011, May 2015.

Ryan, E., **D. Jacques** and J. Colombi, "An Ontological Framework for Clarifying Flexibilty-Related Terminology via Literature Survey", *INCOSE Systems Engineering*, 16(1): 99-110, 2013.

Jacques D. and D. Smith, "A Simplified Building Air Flow Model for Agent Concentration Prediction", *Journal of Occupational and Industrial Hygiene*, Volume 7, Issue 11, 2010.

Selected Honors & Awards

- 2016 – General Bernard Schriever Award for CY 2015

Research Interest Areas

Dr. Jacques is leading research in the area of effective multi-vehicle control for flexible reconnaissance and surveillance operations. As part of this work, he has been utilizing a tailored SE process for rapid conceptualization/design/build/test cycles to enable flight test evaluation of new operational concepts within a 9-12 month cycle time, with this work drawing in students and faculty from multiple departments. He especially enjoys research in the area of optimal design, where system effectiveness is used as the design objective as opposed to lower level subsystem performance measures. He is actively interested in using System Architecture as an analytic basis using methods from graph theory and/or discrete-event simulation.

Lt Col Clay M. Koschnick

PhD, Industrial and Systems Engineering, University of Florida

Assistant Professor of Systems Engineering

Most Notable Publications

Koschnick, Clay and Hartman, Joseph C. (2019). "Using performance-based warranties to influence consumer purchase decisions," *The Engineering Economist*, DOI: 10.1080/0013791X.2019.1642430.

Hines, P.A., Wagner, T.J., **Koschnick, C.M.**, and Schuldt S.J. (2019). "Analyzing the Efficiency of Horizontal Photovoltaic Cells in Various Climate Regions," *Journal of Energy and Natural Resources*, Vol. 8, Issue 1-2, 77-86.

Trudelle, Ryan C., White, Edward D., Ritschel, Jonathan D., **Koschnick, Clay M.**, Lucas, Brandon M. "Modeling Median Will-Cost Estimates for Defense Acquisition Programs". *Journal of Defense Analytics and Logistics*, 2017, Vol. 1, Issue 1, pgs. 19-33.

Trudelle, Ryan C., White, Edward D., **Koschnick, Clay M.**, Ritschel, Jonathan, D., Lucas, Brandon M. "Estimating an Acquisition Program's Likelihood of Staying within Cost and Schedule Bounds". *Defense Acquisition Review Journal*, October 2017, Vol. 24, No. 4, pgs. 600-625.

Kelly, Patrick, Colombi, John M., **Koschnick, Clay M.**, Freels, Jason R. (2019). "Methodology for Including Base Infrastructure in Conceptual Systems Analysis," *87th Military Operations Research Society Symposium*, 17-20 June 2019, USAFA US Air Force Academy, CO, Presentation ID: 43324.

Research Interest Areas

- Engineering Economy
- Decision Analysis
- Econometrics
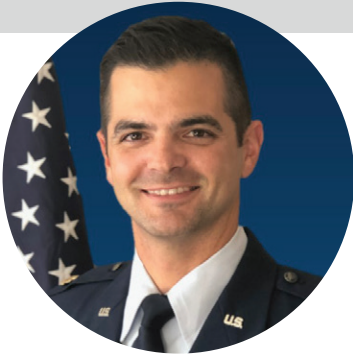
Maj Joseph P. Kristbaum

PhD, Human Factors Engineering, Wright State University

Assistant Professor of Systems Engineering

Most Notable Publications

Kristbaum, J., Ciarallo, F.W. "Reducing Preference Bias through Information Presentation Mode: A Supporting Case for Numerical Anchoring". *European Journal of Decision Processes*, to appear August 2020.

Selected Honors & Awards

- Meritorious Service Medal

- Air Force Commendation Medal with oak leaf cluster

- Global War On Terrorism Expeditionary Medal

- Global War on Terrorism Service Medal

Research Interest Areas

- Organizational Behavior
- Judgement and Decision Making
- Optimization

- Human Systems Integration
- Human Systems Modeling

Dr. Brent T. Langhals

PhD, Management Information Systems, University of Arizona

Associate Professor of Information Resource Management

Most Notable Publications

L. Zoboroski, T. Wagner, B. Langhals, "Classical and Neural Network Machine Learning to Determine the Risk of Marijuana Use." *International Journal of Environmental Research and Public Health*, Vol. 18 (2021).

Engle, R.*, Langhals, B.T., Grimaila, M.R., Hodson, D.D., (2021) "A Methodology for Storing Log Data with Changing Structure in a Relational Database." *Journal of DoD Research and Engineering*, Vol 4, Issue 1, January 2021.

Sigala, A.*, Langhals, B.T. (2020). "Applications of Unmanned Aerial Systems (UAS): A Delphi Study Projecting Future UAS Missions and Relevant Challenges," *DRONES*, Vol 4, Issue 1, March 2020.

Beach, P. M.*, Mailloux, L.O., Langhals, B.T, Mills, R.F. (2019). "Analysis of Systems Security Engineering Design Principles for the Development of Secure and Resilient Systems," *IEEE Access*, Vol 7, Issue 1, July 2019.

Guinn, V. L.*, Langhals, B. T., Elshaw, J. J. (2018). "Evaluating Smartphones for Infrastructure Work Order Management," *International Journal of Interactive Mobile Technologies*, Vol 12, Issue 8, December 2018.

Selected Honors & Awards

- 2018 – AFIT Sigma Iota Epsilon Instructor of the Year

- 2013 – Department of Systems Engineering and Management Educator of the Year

Significant Accomplishments

- Director, AFIT Data Analytics Program

- US Patent No. 9,667,947, Issued 30 May 2017 for "Stereoscopic 3-D Presentation for Air Traffic Control Digital Radar Displays" to SMSgt Jason Russi, Dr. Brent Langhals, Dr. Michael Miller, Mr. Eric Heft.

Research Interest Areas

- Data analytics
- Database
- Human-computer interaction

- Systems engineering
- Psychophysiological cues and vigilance

Dr. David S. Long

PhD, Engineering Systems with Human Factors, Massachusetts Institute of Technology

Assistant Professor of Systems Engineering

Research Interest Areas

- Systems integration
- System analysis
- Performance analysis
- Human factors application and instruction
- Aircraft maintenance
- Flight test
- System development
- Sub-system development
- System integration
- System maintenance
- Process improvements
- Human factors and integration
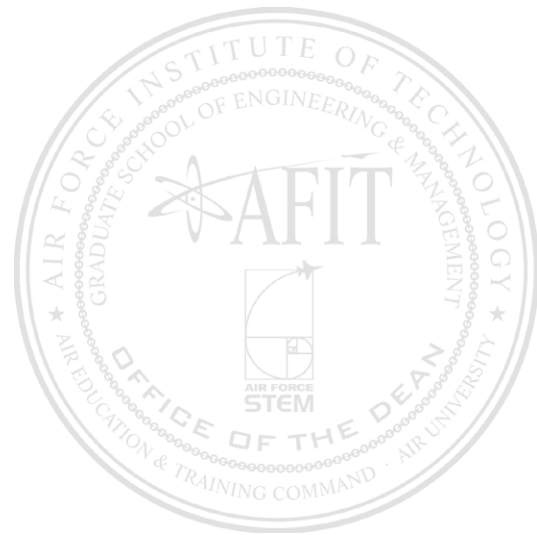
Dr. Brandon M. Lucas

PhD, Economics, George Mason University

Assistant Professor of Systems Integration & Cost Analysis

Most Notable Publications

White, Edward & **Lucas, Brandon** & Ritschel, Jonathan & Mrla, Danielle. (2019). "The impact of WSARA on the cost of Air Force weapon systems." *Journal of Public Procurement*, 2019. 2-14. 10.1108/JOPP-03-2019-022.

Griffith, J., White, E., Fass, R., & **Lucas, B.** (2018). "Comparison of Body Composition Metrics for United States Air Force Airmen". *Military Medicine*, 183(3-4), e201-e207.

Trudelle, Ryan C., White, Edward D., Ritschel, Jonathan D., Koschnick, Clay M., Lucas, **Brandon M.** "Modeling Median Will-Cost Estimates for Defense Acquisition Programs". *Journal of Defense Analytics and Logistics*, 2017, Vol. 1, Issue 1, pgs. 19-33.

Trudelle, Ryan C., White, Edward D., Koschnick, Clay M., Ritschel, Jonathan, D., Lucas, **Brandon M.** "Estimating an Acquisition Program's Likelihood of Staying within Cost and Schedule Bounds". *Defense Acquisition Review Journal*, October 2017, Vol. 24, No. 4, pgs. 600-625.

Klein, Daniel B. and Lucas, Brandon (2011). "In a Word or two, placed in the middle: The Invisible Hand in Smith's Tomes." *Economic Affairs*, Vol. 31. No. 1, pp. 43-52.

Selected Honors & Awards

- DoD Financial Management Certification, Level 3

- Certified Cost Estimator/Analyst, ICEAA (International Cost Estimating & Analysis Association)

Significant Accomplishments

- Delivers graduate education preceded by 21-year military career (ret. Lt Col) as Financial Manager/ Cost Analyst (65F/W) supporting Defense Acquisition & Support.

- Advised 10 students and served on 19 additional committees engaged in relevant defense-sponsored topics.

Research Interest Areas

- Economics
- Profit Analysis
- Cost Growth
- Decision Making

- Schedule Analysis
- Incentives
- Forecasting
- Qualitative Research Methods

- Organizational Culture
- Defense Acquisition System Processes and Policies
- Cost-Benefit Analysis

Dr. Eric G. Mbonimpa

PhD, Environmental Engineering, Purdue University

Assistant Professor of Environmental Engineering and Science

Most Notable Publications

C. Mukherjee, J. Denney, **E.G. Mbonimpa**, J. Slagley, R. Bhowmik. "A review on municipal solid waste-to-energy trends in the USA." *Renewable and Sustainable Energy Reviews* 119, 2020, 109512 (To appear).

Emery I., D. Kempisty, B. Fain, **E. Mbonimpa**. "Evaluation of treatment options for potable water impacted with perfluorinated alkyl substances using life cycle assessment." *International Journal of Life Cycle Assessment* 24, no. 1 (2019): 117-128.

Mbonimpa E., E. Blatchley, B. Applegate, W. Harper. "Ultraviolet A and B wavelength-dependent inactivation of viruses and bacteria in the water." *Journal of Water and Health* 16, no. 5 (2018): 796-806.

Gautam S., **E. Mbonimpa**, S. Kumar, J. Bonta. "Simulating Runoff from Small Grazed Pasture Watersheds located at North Appalachian Experimental Watershed in Ohio." *Rangeland Ecology & Management* 71(3):363-369. 2018.

Emery I., **E. Mbonimpa**, A. Thal. "Climate-based policies may increase life cycle social costs of vehicle fleet operation." *Energy Policy* 101, 1-9, 2017.

Significant Accomplishments

- **Patent: US # 9,546,100 B2**. Continuous-flow solar ultraviolet disinfection system for drinking water. January 17, 2017. E. R. Blatchley, E. G., Mbonimpa, B. Applegate, B. Vadheim.

Research Interest Areas

- Environmental Sustainability
- Life Cycle Assessment
- Water Quality and Treatment
- Energy Sustainability

- Natural Resource Management
- Contaminants Transport
- Environmental Policy
- Environmental Systems Modeling

Dr. John M. McGuirl

PhD, Cognitive Systems Engineering, The Ohio State University

Assistant Professor, Systems Engineering

Most Notable Publications

Peterson, **J. McGuirl**, J.M., Miller, M.E., Bales, D. Sternitzky, B. (2021). "Viewing Air Battle Management Through the Lens of Interdependence." *Proceedings of the 22nd International Symposium on Aviation Psychology*, Dayton, OH.

Miller, M.E., **McGuirl, J.M.**, Schneider, M.F., Ford, T. C. (2020) "Systems modeling language extension to support modeling of human-agent teams." *Systems Engineering*, 23(5), (519-533).

Schneider, M. F., Miller, M.E., **McGuirl, J. M.** (2020) "Tracking Operator Intent in Tactical Operations." *Proceedings of the IEEE International Conference on Systems, Man, and Cybernetics*, Toronto, Canada. (3214-3220)

McGuirl, J.M., Sarter, N.B., and Woods, D.D. (2011) "Incident command situation assessment utilizing video feeds from UAVs: New risks for decision making breakdowns." In M. Jennex (Ed.) *Crisis Response and Management and Emerging Information Systems: Critical Applications*. IGI Publishing.

McGuirl, J.M. & Sarter, N.B. (2006). "Supporting trust calibration and the effective use of decision aids by presenting dynamic system confidence information." *Human Factors*, 48(4), (656-665).

Selected Honors & Awards

- Recognized as one of the "Top 5 Papers of the Year" in Systems Engineering, 2020

- Best Paper in Conference – 3rd ISCRAM Conference, May 2008

- Best Paper in Session – 20th Digital Avionics Systems Conference, May 2001

Research Interest Areas

- Decision Support Systems
- Human-machine Teaming
- Human Systems Integration
- Interface Design
- System Dynamics Modeling
- Model-based Systems Engineering

Dr. Michael E. Miller

PhD, Industrial and Systems Engineering, Virginia Tech

Professor of Systems Engineering

Most Notable Publications

Schneider, M., **Miller, M.**, Ford, T. Peterson, G. and Jacques, D. (2021). "Exploring Intent for Improved Human-Agent Team Coordination," *Journal of Cognitive Engineering and Decision Making*, 13(2-3).

Miller, M.E., McGuirl, J.M., Schneider, M.F., and Ford, T.C. (2020). "A Language and Method to Permit Modeling of Human-Agent Teams," *Systems Engineering*, 23(5), 519-533.

Bindewald, J.M., **Miller, M.E.** and Peterson, G.L. (2019). "Creating Effective Automation to Maintain Explicit User Engagement", *International Journal of Human-Computer Interaction*, 36(4), 341-354.

Kim, S., **Miller, M.E.**, Rusnock, C.F. and Elshaw, J. (2018). "Spatial Audio Improves Call Sign Recognition during Multi-Aircraft Control", *Applied Ergonomics*, 70, 51-58.

Loschky, L.C., McConkie, G.W., Yang, J. and **Miller, M.E.** (2005). "The limits of visual resolution in natural scene viewing," *Visual Cognition*, 12(6), 1057-1092.

Selected Honors & Awards

- Member Editorial Board, *MDPI Systems Journal*, 2020 through 2022

- Southwestern Ohio Council for Higher Education Faculty Excellence Award, 2017

- Best Paper – Safety, Human Factors and Ergonomics, Industrial and Systems Engineering Research Conference, 2016

Significant Accomplishments

- Sixteen years of industry experience as a systems/human factors engineer in multi-national corporations.

- Contributed to more than 100 issued U.S. Patents and 40 published journal articles.

- Inventor of the RGBW pixel format employed by LG Electronics in OLED television.

Research Interest Areas

- Human-Agent Teaming
- Human-Display Integration
- Human Performance Modeling

Maj Brigham A. Moore

PhD, Systems Engineering, Air Force Institute of Technology

Assistant Professor of Engineering Management

Most Notable Publications

Moore, B., Jacques, D., and Schuldt, S. (2021). "Leveraging Network Interdependencies to Overcome Inaccessible Civil Infrastructure Data." *Proceedings of the 2021 Winter Simulation Conference*, IEEE Press.

Moore, Brigham (2021). "Interdependent Infrastructure Recovery Using Multilayered Networks and Optimization." Ph.D. Dissertation, Air Force Institute of Technology, Wright-Patterson Air Force Base, OH.

Moore, Brigham (2017). "Empowering Airmen Builds a Culture of Innovation." *Air Force Civil Engineer* 25(2):7-8.

Moore, Brigham (2014). "Modeling Chlorine Residual and Disinfection Byproduct Formation in Circulating Distribution Systems." M.S. Thesis, University of Alaska Anchorage, Anchorage, AK.

Selected Honors & Awards

- Tri-service National Junior Science and Humanities Symposium (NJSHS) Judge (2021 & 2020)

- Student Field Grade Officer of the Quarter, Department of Systems Engineering and Management, Air Force Institute of Technology (2021)

- Company Grade Officer of the Year, United States Air Forces Europe, MAJCOM-level award recipient (2017)

Significant Accomplishments

- Member of American Society of Civil Engineers (since 2010)

- Member of Society of American Military Engineers (since 2010)

- Professional Engineer – Environmental (since 2014)

- Project Management Professional (since 2017)

Research Interest Areas

- Resilience Engineering of Critical Infrastructure
- Military Engineering Applications and Operations
- Asset Management of Natural and Built Infrastructure
- Civil and Environmental Engineering in Space Operations
- Civil and Environmental Engineering Implications of Millennial Science

Dr. Jonathan D. Ritschel

PhD, Economics, George Mason University

Program Chair, Cost Analysis

Associate Professor of Cost Analysis

Most Notable Publications

D'Amico, C.N., White, E.D., **Ritschel, J.D.**, and Kozlak, S.J. (2018) "Unmasking Cost Growth Behavior: A Longitudinal Study," *Defense Acquisition Research Journal*, 25(1): 30-51.

Trudelle, R.C., White, E.D., **Ritschel, J.D.**, Koschnick, C.M., and Lucas, B.M. (2017). "Modeling Median Will-Cost Estimates for Defense Acquisition Programs," *Journal of Defense Analytics and Logistics*, 1(1): 19-33.

Trudelle, R.C., White, E.D., Koschnick, C.M., **Ritschel, J.D.**, and Lucas, B.M. (2017). "Estimating the Likelihood of a Defense Acquisition Program Staying within Cost and Schedule Bounds," *Defense Acquisition Research Journal*, 24(4): 600-625.

Ritschel, J.D., and Ritschel, T.L. (2017). "Improving Resource Management in the Afghan Air Force," *Air and Space Power Journal*, 31(2): 4-16.

Gardner, N.R., **Ritschel, J.D.**, White, E.D., and Wallen, A.T. (2017). "Forecasting Foreign Exchange Rates for Department of Defense Budgeting," *Journal of Public Procurement*, 17(3), 315-336.

Selected Honors & Awards

- DoD Financial Management Certification, Level 3 (2017)

Significant Accomplishments

- Delivers graduate education supported by 20-year military career (ret. Lt Col) as Cost Analyst (65W) in Defense Acquisition.

- Advised 12 students and served on 36 more committees engaged in relevant defense-sponsored topics.

Research Interest Areas

- Economics
- Cost and schedule analysis
- Public choice
- Operating and support costs

- Effects of acquisition reforms on cost growth in DoD weapon systems
- Research and development cost estimation
- Economic institutional analysis

Lt Col John X. Situ

PhD, Systems Engineering & Operations Research, George Mason University

Assistant Professor of Systems Engineering

Most Notable Publications

Situ, John X.; Friend, Mark A.; Bauer, Kenneth W.; Bihl, Trevor J. "Contextual Features and Bayesian Belief Networks for Improved Synthetic Aperture Radar Combat Identification". *Military Operations Research Society Journal*, Vol 21, No 1, 2016.

Selected Honors & Awards

- Meritorious Service Medal
- Air Force Commendation Medal

Research Interest Areas

- Decision Analysis
- Stochastic Optimization
- Meta-heuristics

- Modeling & Simulation
- Dynamic Programming

Dr. Jeremy M. Slagley, CIH, CSP

PhD, Occupational Safety and Health, West Virginia University

Assistant Professor of Industrial Hygiene and Environmental Science

Most Notable Publications

Mukherjee, C., Denney, J., Mbonimpa, E. G., **Slagley, J.**, & Bhowmik, R. (2020). "A review on municipal solid waste-to-energy trends in the USA." *Renewable and Sustainable Energy Reviews*, 119, 109512.

Trawick, J., **Slagley, J.**, and Eninger, E. (2019). "Occupational Noise Dose Reduction via Behavior Modification Using In-Ear Dosimetry among United States Air Force Personnel Exposed to Continuous and Impulse Noise." *Open Journal of Safety Science and Technology*, 9:2, 61-81.

Titus, E., Lemmer, G., **Slagley, J.**, Eninger, R. (2019). "A Review of CBRN Topics Related to Military and Civilian Patient Exposure and Decontamination." *American Journal of Disaster Medicine*, 14(2), 137-149.

Schaal, N., **Slagley, J.**, Richburg, C., Zreiqat, M., & Paschold, H. (2018). "Chemical induced hearing loss in shipyard workers." *Journal of Occupational and Environmental Medicine*, 60(1), e55-e62. JIF: 1.861

Slagley, J.M., Paschold, H., Engler, J. (2017). "Evaluation of Coverall Field Dry Aerosol Decontamination Methods Using a Manikin" *Journal of Occupational and Environmental Hygiene*, 14(7), 502-509.
DOI: 10.1080/15459624.2017.1296235. JIF: 1.462

Selected Honors & Awards

- 2018 Southwest Ohio Council for Higher Education (SOCHE) Faculty Excellence

- 2017 AFIT Cat III Civilian of the Quarter

- 2011 Best Journal Publication Award, American Industrial Hygiene Association (AIHA), Engineering Committee

Significant Accomplishments

- ABET Program Evaluator

- Member, Noise Committee, AIHA (2004-present) [Chair 2015-2016; 2018-2019]

Research Interest Areas

- Engineering controls of occupational health hazards
- Exposure assessment strategies
- Hazardous noise
- Aerosols
- CBRN detection and decontamination

Maj Trevor W. Sleight

PhD, Civil Engineering, University of Pittsburgh

Assistant Professor of Environmental Engineering and Science

Most Notable Publications

Sleight, T. W.; Khanna, V.; Gilbertson, L. M.; Ng, C. A. "Network Analysis for Prioritizing Biodegradation Metabolites of Polycyclic Aromatic Hydrocarbons." *Environ. Sci. Technol.* 2020, 54 (17), 10735–10744. https://doi.org/10.1021/acs.est.0c02217.

Hardos, J. E.; Rubenstein, M.; Pfahler, S.; **Sleight, T.** "Cholinesterase Inhibition and Exposure to Organophosphate Esters in Aircraft Maintenance Workers." *Aerosp. Med. Hum. Perform.* 2020, 91 (9), 710–714. https://doi.org/10.3357/AMHP.5439.2020.

Selected Honors & Awards

- Meritorious Service Medal

Significant Accomplishments

- President, Engineering Graduate Student Organization, University of Pittsburgh, 2019

- Licensed Professional Engineer, 2015

Research Interest Areas

- Environmental Hazard Evaluation
- Environmental Engineering and Science
- Machine Learning and Data Mining
- Biodegradation

Dr. Alfred E. Thal, Jr.

PhD, Environmental Engineering, University of Oklahoma

Associate Professor of Engineering Management

Most Notable Publications

Clayson, D.S., **A.E. Thal, Jr.**, and E.D. White III, "Cost Performance Index Stability in Environmental Remediation Projects," *Journal of Defense Analytics and Logistics* (accepted 30 April 2018).

Alley, S.L., V.V. Valencia, **A.E. Thal, Jr.**, and E.D. White III, "Probabilistic Assessment of Failure for United States Air Force Building Systems," *Journal of Performance of Constructed Facilities*, 2017.

Emery, I., E. Mbonimpa, and **A.E. Thal, Jr.**, "Climate-based Policies May Increase Life-cycle Social Costs of Vehicle Fleet Operation," *Energy Policy*, 2017.

Valencia, V.V., **A.E. Thal, Jr.**, J.M. Colombi, and W.E. Sitzabee, "Infrastructure Decay Modeling With the Input-Output Inoperability Model," *Journal of Risk and Uncertainty in Engineering Systems*, 2015.

Griffin, J.S., **A.E. Thal, Jr.,** and S.E. Leach, "Enhancing Asset Management Through a Better Understanding of Energy Consumption," *International Journal of Strategic Property Mgmt*, 2014.

Nyikos*, D.M., **A.E. Thal, Jr.**, M.J. Hicks, and S.E. Leach, "To LEED or not to LEED: Analysis of Cost Premiums Associated with Sustainable Facility Design," *Engineering Management Journal*, 2012.

Thal, A.E., Jr., and D.E. Shahady, "Innovation in a Military Research Laboratory: An Initial Exploratory Study," *Technology Analysis and Strategic Management*, 2010.

Selected Honors & Awards

- Sigma Iota Epsilon (SIE) Management Instructor of the Year, 2015

- Best Application Paper Award, Western Decision Sciences Institute (WDSI) Annual Meeting, Maui, Hawaii, 31 Mar-3 Apr, 2015

- Best Paper Award in Engineering Economy Track, Industrial and Systems Engineering Research Conference (ISERC), Orlando, Florida, May 19-23, 2012

- Merritt A. Williamson Best Conference Paper Award, American Society of Engineering Management (ASEM), Rogers, Arkansas, October 13-16, 2010

Research Interest Areas

- Engineering management
- Facility/infrastructure management
- Project management
- Risk management

- Economic analysis
- Innovation
- Sustainability
- Process improvement

GRADUATE SCHOOL RESEARCH

BY THE NUMBERS

$27,016,361
FY21 Research Expenditures

$29.9M
FY21 External Research Awards

7 Research Centers
Dedicated to Autonomy, Cyber Security, Hypersonics, Directed Energy, Data Analytics, Digital Engineering, Defense Innovation & Artificial Intelligence.

Autonomy and Navigation Technology Center

The Autonomy and Navigation Technology (ANT) Center is a forward-looking research center seeking to identify and solve tomorrow's most challenging navigation and autonomous and cooperative control problems. The ANT Center's goal is to develop navigation technology that ensures we can navigate anywhere, anytime, using anything. The ANT Center focuses on three research thrusts: autonomous and cooperative systems, non-GPS precision navigation, and robust GPS navigation/NAVWAR.

Center for Cyberspace Research

The Center for Cyberspace Research (CCR), established in March 2002, conducts cyber security and cyber operations research at the Master's and PhD levels. CCR affiliated faculty teach and direct graduate research focusing on understanding and developing advanced cyber-related theories and technologies, such as critical infrastructure protection, cyber-physical systems, network intrusion detection and avoidance, insider threat mitigation, cyberspace situational awareness, malicious software detection and analysis, software protection, and anti-tamper technologies.

Center for Directed Energy

The Center for Directed Energy (CDE) supports Air Force and DOD agencies in transitioning Directed Energy weapons, such as high energy lasers (HELs), to the battlefield through vigorous scientific experiments, engineering research and diverse consulting activities, in conjunction with educational programs offered through the Department of Engineering Physics.

Center for Space Research and Assurance

The Center for Space Research and Assurance (CSRA) is focused on delivering highly-valued resilient, responsive, and reliable space capabilities to the DOD and Intelligence Community

through executing cutting-edge space technology development, science, and space experiments in collaboration with government organizations to meet the challenges of tomorrow by developing the technical space cadre through world-class research and immersive hands-on graduate education.

Center for Technical Intelligence Studies and Research

The Center for Technical Intelligence Studies and Research (CTISR) is focused on Air Force, Space Force, DOD and Intelligence Community's scientific, technical and operational activities through graduate research programs. CTISR brings together cleared faculty across academic departments to solve difficult, multi-disciplinary technical intelligence problems.

Nuclear Expertise for Advancing Technologies

The Nuclear Expertise for Advancing Technologies (NEAT) center was established within the AFIT graduate school with three primary functions: research, education, and publications focused on human capital development. The objective of the research is to tie together the disparate technological areas and disciplines to be at the cutting-edge of present and future technologies.

Homeland Security Community of Best Practices

The Homeland Security Community of Best Practices (HS CoBP) is the new strategic arm and tactical day-to-day team of experts at the Air Force Institute of Technology to support the Department of Homeland Security (DHS) in test and evaluation (T&E). The HS CoBP mission is to conduct roundtable events to foster innovative, quality, and agile activities to build an authoritative community of strategic professionals from government, industry, and academia to author critical area T&E best practice guidebooks to ultimately assess and assist acquisition programs.

In addition to the Graduate School's seven dedicated research centers, AFIT has been designated as the Air Force's Cyber Technical Center of Excellence and manages the Scientific Test & Analysis Techniques Center of Excellence. Learn more at www.AFIT.edu/ENR.

FACULTY DIRECTORY

Graduate School faculty directory current as of October 2021. Names appear in alphabetical order by department. Graduate School Dean and Department Head names appear in bold.

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